THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND

by

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CHAPTER I

INTRODUCTION: THE LAND AND THE PEOPLE

Thailand, the land which was once known as Siam, is a kingdom in Southeastern Asia. Her neighboring countries are Burma to the north and west, Laos and Cambodia to the east, and the Malaysian Federation to the south. Its southern border is met by the Gulf of Thailand. Thailand covers an area of 200,140 square miles and has a total population of more than 35 million. Bangkok, the largest city, is the capital and chief port of Thailand.

Background of the People

Originally the Thai people lived in the southern region of China, specifically in Yunan (China). While still living in China, they organized themselves into small tribes and formed an independent kingdom called Nanchao. The armies of Nanchao carried on small battles with tribes in China. Several centuries before the Christian Era many of Thai tribes immigrated from Nanchao southward into Indochina or into what is now Northern Burma, Thailand and Laos. The kingdom of Nanchao was conquered by the Mongol Empire of Kublai Khan in 1253, and this situation caused a massive migration from China southward. Some of these people settled in the mountainous regions of northern Thailand, and others travelled further south, finally setting down in the northern part of the rich alluvial plain of the Menam valley in Central Thailand. The tribes in Central Thailand did not form independent principalities


CHINA
KOREA
JAPAN
NEPAL
INDIA
BURMA
LAOS
THAILAND
CAMBODIA
VIET NAM
HONG KONG
TAI WAN
PACIFIC
OCEAN
PHILIPPINES
CEYLON
INDIAN
OCEAN
MALAYSIA
SINGAPORE
BORNEO
INDONESIA

FIGURE 1

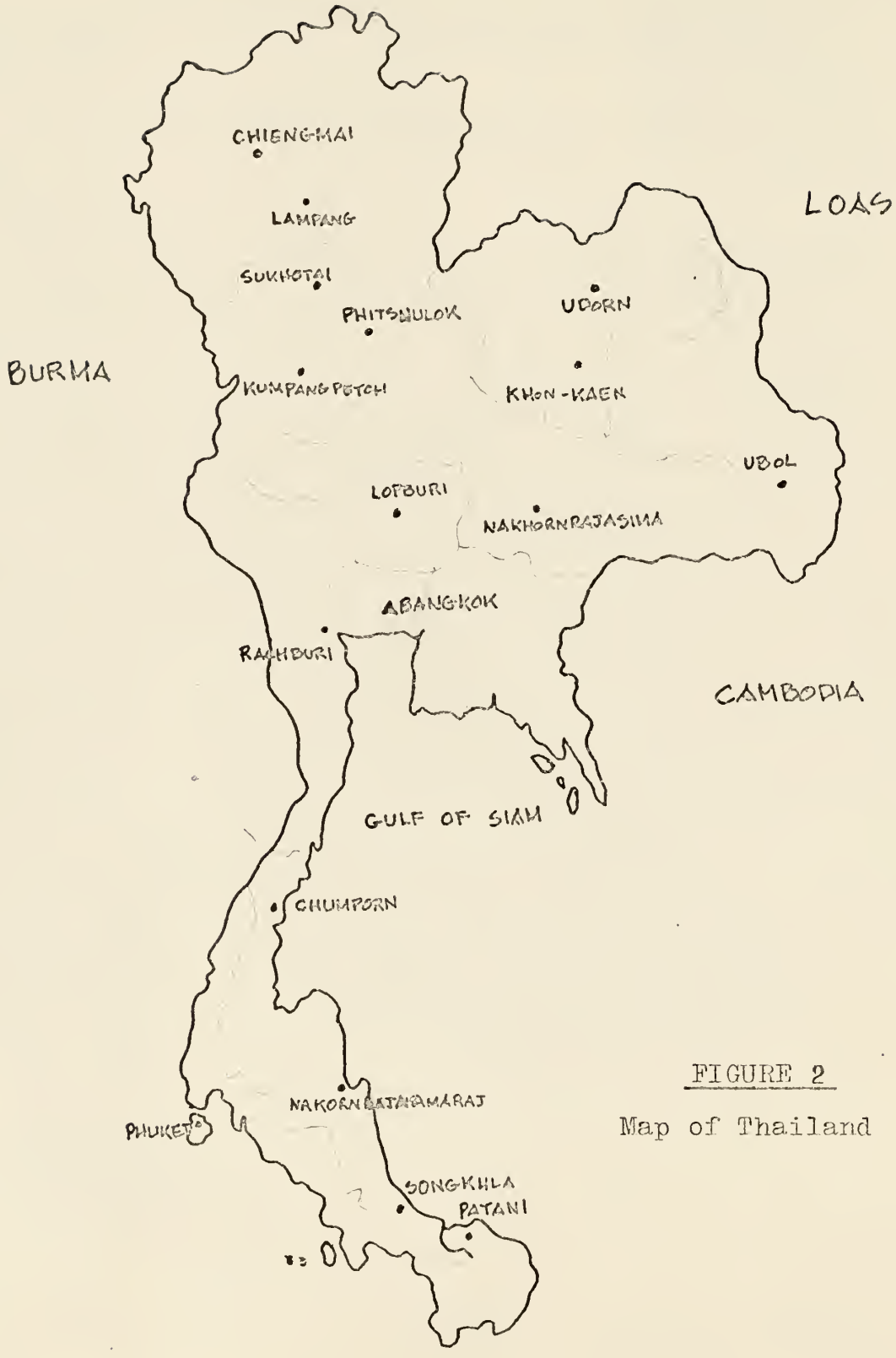


FIGURE 2

Map of Thailand

as did the tribes to the north; instead their principalities were under suzerainty of the Khmer Empire. In the 13th century A.D. they were successful in unifying the various tribes into the Thai Kingdom of Sukhothai. The Sukhothai period lasted until the 15th century. It was during this period that Thailand, or what was then Siam, developed a unique culture and character of its own. Unlike the other nations of Southeast Asia, Thailand was never colonized by a western power, and it therefore retained a purer form of its original culture. Eventually the three Thai kingdoms of Sukhothai, Ayuthaya, and Chiengsan and other parts of Thailand were united into one unified Kingdom, which was named Siam until 1939, when the name was changed to Thailand.

Physical Features

Thailand may be divided into four geographical regions: the northern mountainous region between the Salween and Mekong rivers; the eastern Mekong drainage system; the central basin of the Chaopaya River; and the southern peninsula. The mountains in the north are a series of parallel ranges divided by cultivated valleys. The southern most ranges are gently sloping hills and the mountains of the northwest stretch to heights of 8,000 feet. Northeastern Thailand is a sparsely populated region, poor in resources. This land is cultivated and developed slowly. The richest region of the country is the central alluvial plain. It is also the heaviest populated section. Here some of the world's finest rice is grown. The southern peninsula is 40 to 100 miles wide and is divided lengthwise by mountains. Thailand mineral wealth is located in this region; furthermore there

are many ports on the approximately 1,500 miles coastline.

More than 50% of Thailand is covered with thick forests. The northern forests of the mountains provide excellent hardwoods; teak is the most outstanding one. Pines also grow in this region. Bamboo, coconut, and betel palms are characteristic of the central region. The coastal lands are shaded by mangroves and rattans. The country is rich in a wide variety of tropical fruits, particularly mangos, mango steens, durians, pomegranates, bananas and pineapples.

Climate

Thailand, part of the southeast tip of the Asian mainland, stretches from 6° to 20° north of the Equator. Except for its somewhat milder region, Thailand is part of the warm humid tropical climate zones.

The weather in Thailand might be more understood where compares it with the weather of Honolulu, Hawaii (see figure 3), at approximately the same latitude. Honolulu has mild weather throughout the year with temperatures varying from 57° F to 83° F, and no seasonal extremes. In contrast, Thailand has three well-defined seasons: the rainy season, in which the strong monsoon rains occur; winter, the mildest season of the year; and summer, a hot, humid season. But like Honolulu Thailand's temperature varies little. During winter, the most comfortable months, the temperatures normally vary only about 25° F. Yearly temperatures vary little more than about 30° F. The yearly rainfall of Honolulu is approximately 25 inches, whereas Thailand's yearly rainfall is 45 to 55 inches over most of the country with still more in the southern peninsula.

FIGURE 3

HONOLULU WEATHER

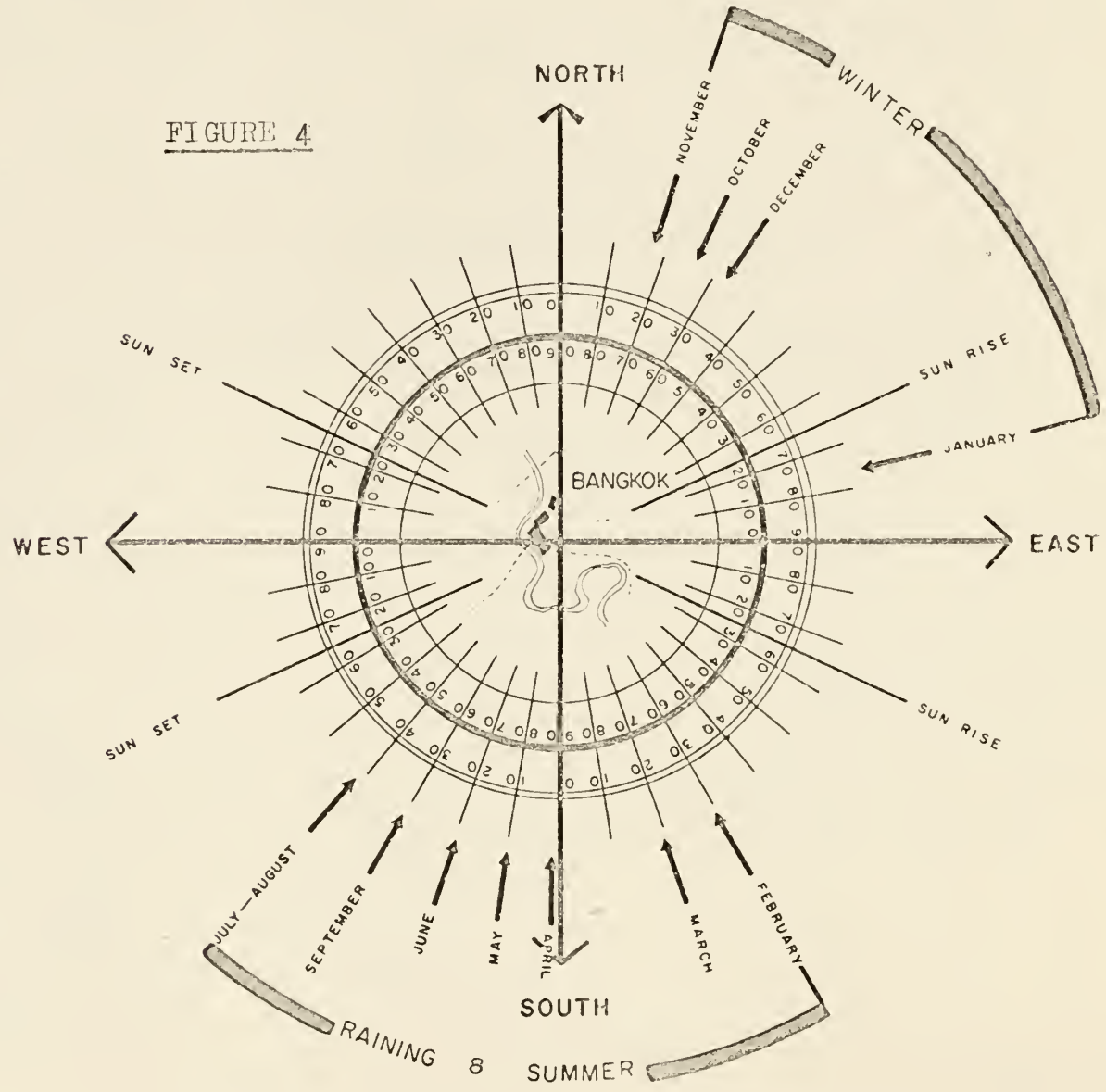
MONTH	TEMPERATURE F°			HUMIDITY			WIND	RAIN°	
	MEANS.	MAX.	MIN.	MEANS	MAX.	MIN.	DIRECTION	INCH	DAYS.
JULY		82	73	67%				.9	14
AUGUST		83	73	68%				1.1	13
SEPTEMBER		83	74	68%				1.4	13
OCTOBER		82	72	70%				1.9	13
NOVEMBER		80	70	71%				2.5	13
DECEMBER		78	69	72%			NE	4.1	15
JANUARY		76	69	71%				4.1	14
FEBRUARY		76	67	71%				2.6	11
MARCH		77	67	69%				3.1	13
APRIL		78	68	67%				1.9	12
MAY		80	70	67%				1.0	11
JUNE		81	72	66%				.7	12
TOTAL								25.3	154

TEMPERATURE, HUMIDITY, WIND, AND RAIN
OF
BANG KOK & CHIENG MAI

SEASONS		TEMPERATURE F°						HUMIDITY						WIND		RAIN INCH			
		BANG KOK			CHIENG MAI			BANG KOK			CHIENG MAI			BANG KOK	CHIENG MAI	BANG KOK		CHIENG MAI	
SEASON	MONTH	MEANS	MAX.	MIN	MEANS	MAX.	MIN.	MEANS	MAX	MIN.	MEANS	MAX.	MIN.	DIRECTION		INCH	DAYS	INCH	DAYS
RAINY	JULY	83	90.4	76.6	80.7	88.4	73.4	79.1	80.3	63.7	79.6	95.4	67.4	S SW	S SW	6.5"	15	9.6"	19
	AUGUST	83.2	91.0	77.2	79.1	86.5	72.7	76.1	87.3	70.6	78.5	88.4	68.3	S SW	S SW	6.0"	13	8.2"	21
	SEPTEMBER	84.4	90.4	76.0	80.7	88.7	73.6	76.6	93.1	67.9	83.9	90.4	75.9	S SW	S SW	13.2"	20	10.6"	19
	OCTOBER	83.4	90.1	77.2	80.4	87.8	71.9	79.3	90.7	70.6	78.9	91.0	69.9	N NE	S SW N	6.9"	14	4.2"	15
WINTER	NOVEMBER	82.7	87.3	77.6	77.3	86.7	66.4	78.4	91.4	72.1	75.9	83.4	71.9	N NE	S SW N	2.0"	5	1"	6
	DECEMBER	81.2	81.0	75.1	74.2	82.7	64.5	77.6	85.4	60.9	79.3	95.0	60.1	N NE NW	S SW N	.4"	2	1"	7
	JANUARY	83.0	92.9	69.4	72.4	85.2	57.3	65.6	75.7	52.2	66.6	79.8	55.6	N NE E	N SW S	.25"	1	.06"	1
	FEBRUARY	85.5	95.3	70.9	73.9	89.2	55.7	67.8	81.0	56.0	68.1	91.2	55.0	S SW E	S SE	1.27"	4	.01"	1
SUMMER	MARCH	86.0	97.0	75.3	79.4	94.8	62.7	60.2	66.3	58.0	56.8	63.2	49.0	S SW	S SE	1"	2	0.3"	1
	APRIL	89.2	98.2	76.1	83.6	99.7	68.9	66.5	86.5	55.0	58.7	75.3	49.8	S SW SE	S SE SW	.4"	0	1"	6
	MAY	86.7	95.2	77.0	85.0	95.5	73.6	70.6	88.0	60.3	71.2	87.0	62.4	S SW SE	S SW SE	5.5"	13	5.5"	15
	JUNE	86.7	96.5	75.8	82.1	91.5	74.1	73.4	89.3	63.9	73.2	96.2	52.4	S SW	S SW SE	6.5"	12	.4"	12
TOTAL																55.25"	107	49.49"	163

The prevailing winds of Thailand are very complicated and very influential because they control the rains (see figure 4). During the winter months the winds come from the northeast. In the summer and rainy season the winds come across the Indian Ocean from the southeast and southwest, bringing with them moisture which is released when it meets by the cooler air above the land.

FIGURE 4



PREVAILING WIND IN BANGKOK

The Family

Some people believe that there are serious problems of interpersonal relationships and conflicts between members of a Thai family. Graham*, for example, points out the ever-widening gap between the ways of life of older and younger generations and states that the younger Thais are reluctant to accept guidance from those more experienced (in their family group) in facing life problems. The sharp deemphasis in "age status" in Thai society tends to reinforce this social pattern and leaves the older generation with little authority to provide guidance to the new generations. The increasing rejection of the older values and authorities by the young is prompted, in part at least, by the appeal of "western" value patterns with which they come into contact, everyday through television, radio, movies, magazines, newspapers and other forms of mass media and communications.

Graham makes the point that Thai families lack certain problem-solving resources that families in other cultures possess. The situation is complicated by the fact that many Buddhist priests in Thailand are reluctant to give counsel concerning personal and family problems. Such counsel is particularly vital in the large population areas where the impact of change is greatest and the need for counseling service is most urgent.

It is interesting to note that Graham also observed that in the West, books, feature articles, lectures and discussion provide a

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*Graham, H. M., "Some Changes in Thai Family Life", 1958, pp. 4-6.

scientific explanation of human behavior and aid in achieving self-understanding and help in preventing and solving family problems. Such situations are not common in Thailand. The young person who finds no adequate guidance to solve his problems of inter-personal relationships on a rational, scientific ground from his own family, tends to feel lost; or some may find it rather convenient to experiment with their lives and social relationships on a trial and error basis. In such cases, the school may take over the function of the family in providing intellectual resources for social living.

The secondary school seems to be a proper place for boys and girls to acquire a more accurate appraisal and knowledge about themselves, to learn social roles of men and women, to learn to respect others on the bases of competency and leadership as well as of respect for age. In moving toward being a coeducational institution, the secondary school can provide a natural setting in which boys and girls learn to live and work together as co-workers and friends under the guidance of an understanding guidance-oriented teacher: this situation could further lead to a development of a wholesome attitude on the hurt of the youngsters toward the opposite sex, marriage, and life in general.

Government and Politics

As was indicated earlier, at present there exists a trend toward a rejection of traditional values by the younger generation. The older generation reacts strongly against this situation as being "not Thai" or "too westernized". It should be pointed out that reverence

for elders is still basic in Thai culture. A parallel might be drawn between this situation and the people's attitude toward the authority of the government. Traditionally, the Thai citizens would not question the actions of government authorities any more than they would question the action of their fathers. Although criticism by the people (and particularly the "press in Bangkok") of governmental affairs has recently been voiced; this criticism cannot be considered characteristic of the general Thai public.

In recent years, increasing emphasis has been placed upon the individual's responsibility to be concerned with and involved in active participation in the affairs of the government. Government officials and other leaders of the country have indicated through their work on the new constitution for Thailand that they are determined to have a government based upon the principle of popular sovereignty. Since the success of a democracy depends upon the interest and concern of the people, it is reasonable to assume that the schools must play an active role in teaching potential voters the importance of understanding their obligation to exercise their political rights.

Training in political philosophies and theories will make future generations less reliant on others to make decisions which affect the country. Participation in political activities will make them more conscious of their role as responsible citizens.

Communist infiltration in Southeast Asia, including certain parts of Thailand, and its threat to the national security demand a stronger unity among all the people including broader understanding of their own

culture and society. Here again clarification and extension of the concept of democracy is vital to strengthen and unify the nation. It is quite necessary that the majority of Thai citizens become informed concerning their role in society and that they be given the opportunity to participate fully in upholding democratic principles.

Religion

The Buddhist way of life is an integral part of the national life of Thailand. There is, obviously, a close relationship between the monarchy, the government, the educational system and the Bugghist religion. The king is the patron of Buddhism; the schools are required by law to set aside regular periods for religious holidays.

There has been some concern because the changing social goals and practices (with the attendant change of attitudes and values) have appeared to come into conflict with the traditional teachings of Buddhism. It may be necessary to adjust certain instructional methods to harmonize the secular and spiritual elements in the Thai culture.

Buddhism has permitted great tolerance and flexibility in religious thinking. Perhaps this is one reason why Thailand has enjoyed freedom from religious persecution. Because young people need training in morality and religion, it is likely that instruction in them will continue to be included in the curriculum. Certainly, reminders concerning the virtue of thrift, diligence, respect for parents and elders, benevolence, moderation, etc. will be helpful to students in their preparation for a happy and productive life.

The schools can play a vital part in the preservation and improvement of Thai culture and society.

The Economy

In changing from a simple agricultural economy to a more complex system of production and diversification for a world market and industry, Thailand is confronted with many economic problems and dilemnas. For instance, a change from a subsistence economy to a commercial economy calls for a knowledge and understanding of the principles of marketing and banking and sophistication in international trading. Management of the natural resources of the country is imperative for the survival of the national economy.

The government of Thailand has established a number of boards and offices to investigate needs and implement programs which will further economic development. The schools will be obliged to train the people to fill the positions which are and will be needed.

Education for economic competency involves much more than training in some vocational skills. Students should have the opportunity to study and discuss various economic systems, laws and principles and how they might be related to the situation in Thailand.

Education

The educational system is expected to take over tasks previously assigned to families, priests, employees and government officials. This dependence on the schools places a heavy, but rewarding, respon-

sibility on teachers to provide young people with the experiences needed to live happily and successfully.

More "educated" people will be needed in the future and it is quite conceivable that, in a few years, the goals set in the Karachi plan will be inadequate to meet the demands made by the economic growth of the country. It should be noted again that while reference is frequently made to the close relationship between education and economics, schools must be equally, it not more, concerned with enrichment of individuals and with responsible citizenship.

If the schools are to carry out their mission, larger and larger allocations will need to be made for this phase of the government work. Higher salaries must be offered to attract the most competent people into the teaching profession. Additional facilities will be needed in buildings, laboratories and libraries; teacher preparation must be more intensive and extensive; more in-service training will be necessary to help teachers with instructional techniques and to keep abreast of new developments in their areas of specialization.

It is apparent that careful planning is vital to provide the most efficient and economical educational system possible and to make certain that the schools carry out their role in furthering the progress of Thailand.

CHAPTER II

EDUCATION OF THAILAND

History of Education in Thailand

The present educational system in Thailand is the product of many forces and influences which have been forged and tempered many centuries. The first educational system in Thailand was quite similar to that of the monastic and cathedral schools of Medieval Europe, i.e., it had a religious orientation and was centered in the temples. Historical evidence shows that the system was quite informal and offered only limited subject matter. The primary purpose was to provide moral and religious instruction and, for all practical purposes, was designed to train only the male members of the society. Vocational training was carried on in the family units. Young boys were taught how to farm, hunt, fight and develop some basic skills in handicrafts; girls were also given training in farming as well as in domestic skills. Only the children of the aristocrats could expect to receive training in the arts and other areas associated with "higher education".

The history of education of Thailand may be logically divided into three periods:

1. The period of traditional education from 1257-1868.
2. Period of educational expansion, from 1868-1931 and
3. The present period, from 1932 to the present.

The Period of Traditional Education

In 1283 King Ram Khamhaeng, the third king of the Sukhothai period, introduced the alphabet that has been used continuously to the present time. This alphabet was modified from time to time until the present system of writing was developed. Literature of the Sukhothai period indicates that even a few women were given the opportunity to become literate but, generally, this privilege was extended primarily to men in the court and the temples.

This monastic, or temple, education continued for at least six centuries, i.e., from the beginning of the Sukhothi period (1257-1377) through the Ayodthya period (1377-1767), the Thonburi period (1767-1782), up to the beginning of the first stage of the Ratanakosin period (1782-1868).

During this era there were few significant changes in the educational system. The government did not take an active role because it was felt that education was primarily the responsibility of religious leaders. Hence, the Budhist priests (monks) assumed the major responsibility for "public" instruction.

During the Ayudthya period (1377-1767), Thai people were brought into contact with the western world for the first time. Records show that some Portuguese came to Thailand in 1511. Later, in 1662, French missionaries arrived in Thailand. They brought with them many skills and ideas which helped the educational program to progress during this period. They set up private schools to teach Christian and western culture to the natives. King Narai, who suspected the motives of the French missionaries, maintained a tight control over these private schools.

During King Narai's reign, increasing attention was given to the development of reading and writing skills. New textbooks were compiled to further development in these skills, and they were widely used until the early Ratanakosin period. The impact of this emphasis is shown in the quality and quantity of literary works that were produced in this age.

With the beginning of the present dynasty (Chakri), new emphasis was placed on improving education and encouraging cultural development in Thailand. King Rama I wrote several books and urged others to follow his example. During the reign of King Rama II many poets, including the king himself, produced a great number of literary masterpieces. "Ramakian", the Thai version of "Ramayana", was written during the reign of King Rama II.

Thailand was brought into contact with western countries again during the reign of King Rama II. Presbyterian missionaries came to Thailand and started setting up schools to teach religion. American missions contributed greatly to the improvement of Thai education, especially after one of their leaders, Dr. Bradley, set up a printing press in 1837 to print Thai books.

King Rama III was one of the first monarchs to show great interest in public education. He urged the learned men of Thailand to record their knowledge in written texts so that this information could be made available to all literate people. When Rama III rebuilt "Wat Prachetupon", he had many of these texts inscribed on the stones around the temple--and this procedure is why Wat Prachetupon is sometimes called "the first public university of Thailand".

As Thailand established closer relations with the western countries, greater interest developed in learning foreign languages. King Rama IV studied English in order to better understand western culture and politics. He, along with his children and some members of the court, was taught by an English woman, Mrs. Anna Leonowens. He laid the foundation for a period of educational reform and expansion in the reign of his successor, Rama V.

The Period of Educational Expansion

A modern school was established by King Chulalongkorn (Rama V) on the palace grounds in 1871. This school was the first of its kind in Thailand and its primary purpose was to train boys for office work or civil service. It differed from other schools of the time because the latter were dedicated simply to the objective of bringing up boys to be "well-read men of good behavior". "The Royal Command School" or "Palace School" had regular hours for learning and employed laymen as teachers. It taught not only reading and writing but also arithmetic and other subjects which would be required in government offices.

The growing need of government officials as the government expanded its scope of work and the demand to set up a common standard for public instruction prompted the establishment of more of these schools in 1884. Some public instruction was extended into the provinces, but the lessons were taught in the Buddhist temples or wats. The promotion of such instruction is an example of the administrative wisdom of King Rama V. On one hand he was preserving the old custom of Wat learning and on the other he was curtailing the great expense that would have

been involved in the construction of new schools. King Chulalongkorn's reign initiated a new era in the history of the nation. Through his encouragement of education, many of government schools were opened and people were happy to send their children to those schools.

In 1887, the Department of Education was established, and five years later it became a "Ministry". The new ministry was assigned the responsibility of providing instruction in culture and religious affairs as well as in educational administration. "The Ministry of Education" laid the foundation of education expansion and better administration. New textbooks were written for teaching the Thai language in the schools and a nation-wide system of examinations was put into practice.

Though the educational character at the end of the nineteenth century seems to be parochial, there was a tendency towards establishing a broader national scheme and this reform called for some sort of systematic plan of education. In 1898 such a scheme was formulated to deal with all the provinces of the kingdom. This national scheme of education outlined curricular content and established grade levels within the total system of education; a specific reference to girls' education was included.

In 1909 another scheme of education was put into effect which divided education into two streams: academic and vocational. It was agreed at that time that higher education instruction would be established later. A revised plan was announced in 1913 by King Rama VI; then the 3-3-3-2 plan of education was adopted instead of the former 3-3-3 plan. From that time on, all general educational plans were

formulated on a national basis. The first "Private School Act" was passed in 1918. It dealt with the registration and government supervision of private schools. It was followed in 1921 by the first "Compulsory Education Act" which stipulated that all children, both boys and girls, were to go to school from the ages of seven to fourteen years. Advanced courses were offered at "Chulalongkorn University" which was founded in 1916. Then a system of national education was underway. Looking back at the educational schemes, one can see that an effort was made to train young people to meet economic and social conditions of the changing times.

The Present Period

The year 1932 marks the beginning of the third period and the present period of Thai educational history. The new revolutionary government made many efforts to improve the educational system. Increased emphasis was placed on meeting the needs of an individual even though the emphasis was still that education should meet social needs that were in harmony with the economic and political system of the country. A new national scheme of education (a 4-4-4 plan) was devised the year the revolutionary government came into power. To help implement the plan, an educational council was appointed as an advisory body; three years later a new "Compulsory Education Act" was also adopted which provided for financial assistance to these schools and also provided for school inspectors from the "Ministry of Education" to visit the schools.

Several things happened in 1936 which affected the educational system. The revolutionary government wanted to expand elementary education as fast as possible. It was spurred by certain "provisional articles" in the "Constitution." The Constitution stated that the "Parliament" was to be composed of two types of members: elected and appointed. It also stipulated that the provinces in which more than half of the adult population was literate and would have full representation. This requirement brought about a rapid expansion of elementary education throughout the kingdom. A considerable amount of the budget was spent on a literacy campaign and little was left for developing secondary education. Secondary school programs were cut down to six years (grades 5-10). A few pre-university schools (grades 11-12) were set up to educate a select group of tenth graders who would enter the university. Those who could not enter the pre-university schools could go to higher vocational schools. Vocational schools on lower levels (grades 5-7 and 8-10) were established because the government wanted to discourage the students from academic study and to encourage them to train for some vocation. In order to save expenditures on academic secondary schools, the government proclaimed that it would maintain only a limited number of government secondary schools as examples for private schools. This meant that the majority of high school students had to be taught in private schools. The result of all of those procedures was the concentration of educational resources in the Bangkok area and the rapid expansion of private secondary schools.

From the beginning, vocational schools at the lower levels were not popular. It was believed that only the weaker students went to vocational schools. Poor achievement in academic subjects, lack of proper facilities and untrained teachers gave support to this popular belief and the enrollments in vocational schools declined. A sudden change came when the Ministry of Education adopted a policy of employing the graduates of vocational schools as teachers in the elementary schools. Almost immediately all lower vocational schools in the provinces were filled to capacity. The enrollments dropped drastically again a few years later when the Ministry stopped recruiting their graduates to teach in the elementary schools.

During the Second World War, the organization of schools appeared to remain intact but actually the activities and functions of the schools were greatly disrupted. Children were evacuated and most schools were closed. Some students studied at home and were permitted to sit for various examinations. Academic standards in the schools continued to decline after the war ended even though industrial development and the standard of living began to rise.

In 1951, another scheme of education was adopted, but it was essentially the same as its predecessor with only some slight modifications and additions. The school system was organized into four years of elementary education, three years of lower secondary school, three years of upper secondary school and two years of pre-university courses. The lower secondary grades were divided into three streams: an academic stream for the children who wanted to prepare for higher learning; a vocational stream for those who wanted to seek employment

earlier; and a general stream for those who did not want to go beyond grade seven. On the upper level there were two streams: academic and vocational. From grade 10 on, three grades of higher vocational schools were organized parallel to the two pre-university classes. It was hoped that fewer students would go on to the academic stream and that a great number of them would take vocational and general courses. Perhaps it was because opportunities for work in the fields of industry and commerce were so limited and because the prestige of white-collar jobs was so high that few went into the vocational stream. But whatever the reasons may be, the majority of secondary school students still strive to enter the academic stream, especially on the lower secondary level.

The imbalance of enrollments has caused great concern to educational authorities. During the times that the country needed semi-skilled and skilled craftsmen and the need of higher education was limited, they did not want too many students to enter the academic stream; hence, they tried to improve vocational education in many ways. More school facilities were provided; better teachers were recruited and more diversified courses were offered. Still vocational schools on lower levels continued to lose students to academic schools. Only the higher vocational schools gained more students. In the meantime, government academic schools could not expand fast enough and private schools flourished in Bangkok and other big towns.

In 1960 a new "National Scheme of Education" came into being. It put particular stress upon meeting the needs of the individual and of society. It reaffirmed the goal of the "Karachi plan" (compulsory

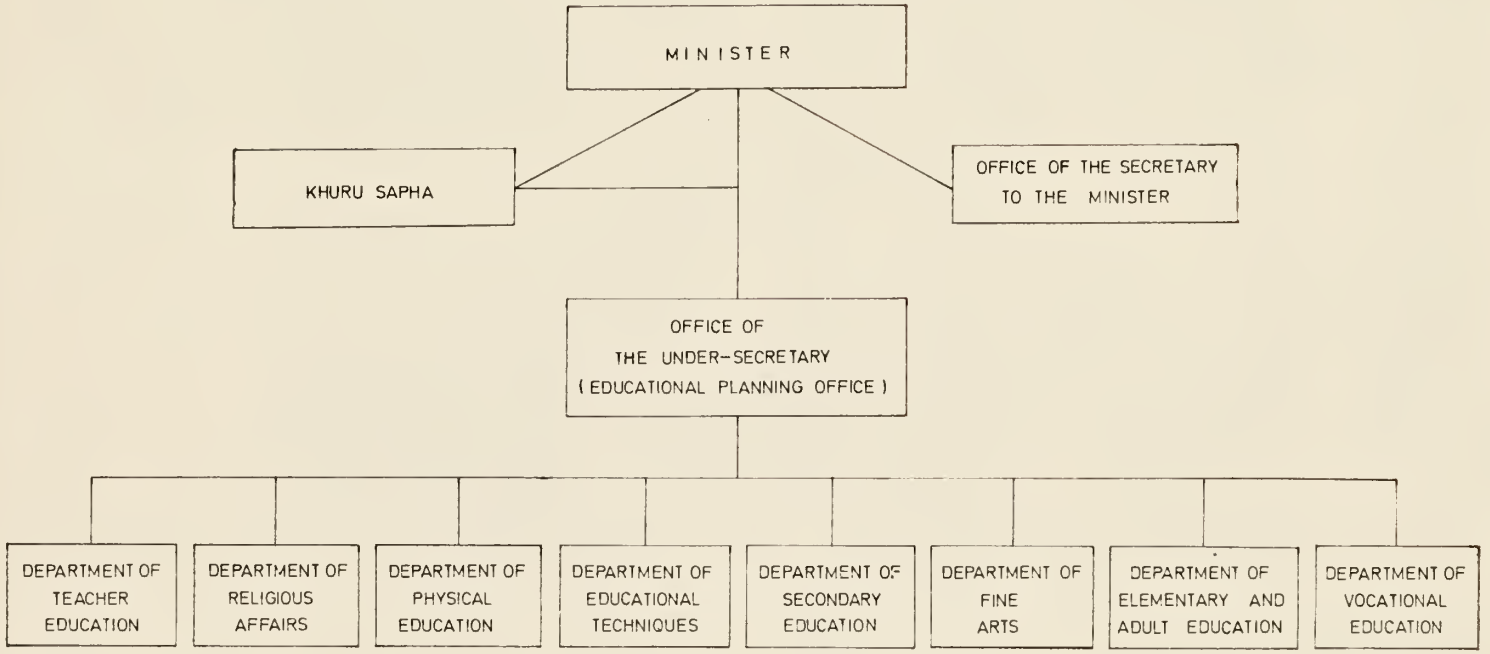
education through grade seven) and introduced some significant curricular experimentation at the secondary level. The most novel change in the secondary schools is in the experimental comprehensive-type high schools. The curriculum for those schools combines both academic and pre-vocational subjects. It is intended to meet the needs mainly of those who will not be continuing their education in a college or university, but it is not a barrier to such higher education.

Administrative changes in the national educational system have also been made over the past several years in order to facilitate the various new plans and curricular changes. For example, the kingdom has been divided into twelve regions, each with a regional educational officer in charge; supervisory centers exist in each region. In every region as well as every province there is an advisory committee which considers problems related to education. An agency which legally has the right to coordinate all aspects of education is the "National Educational Council" created in 1959. In practice, however, it has limited itself primarily to matters pertaining to higher education.

In the light of the need for the development of human resources and manpower in Thailand, the Ministry of Education believes that secondary education should be given a high priority. It plays a critical role in meeting social and economic goals. There is a demand for well-educated secondary graduates in the national plans for development. Various studies have been conducted and projects planned to meet these demands. Among them are the "Loan Project" for the "Improvement of Vocational Education" (1966-1970) and the "Experimental Comprehensive Secondary School Project". The most

FIGURE 5

MINISTRY OF EDUCATION ORGANIZATION



significant recent study of Thai education was that of the "preliminary of education and human resources in Thailand" conducted by a joint Thai-Usom Study Group in 1963. Two of the major recommendations of this study were that there be established an agency for educational planning and that there be a more comprehensive study of secondary education. The present study and the office under which it is conducted present a fulfillment of those recommendations.

Its history shows how education in Thailand has changed over the years to make the schools responsive to the aspirations and goals of the Thai people.

Organization and Administration

This discussion deals with the organization and administration at the Ministry, regional, provincial and local levels by showing the relationship of offices, and the way the school units are served by the organizational pattern.

Ministry Level Organization

The organization of the Ministry of Education can best be understood by reference to Figure 5. The basic organization consists of two offices and eight departments.

The Office of the Minister's Secretary

The Office of the Minister's Secretary is responsible for assisting the Minister in the duties of his office. The social and cultural responsibilities account for a large portion of the work load. The

numerous occasions on which the Minister must be assisted in representing the Ministry of Education, both domestically and internationally, require many hours. The correspondence of the Minister as well as the reports and speeches required of the office use the time of a well-balanced staff. The contacts of the Ministry of Education with other divisions of government are normally handled through the Office of the Minister's Secretary and the Office of the Under-Secretary, but the individual departments, if a situation demands, cooperate in programs to carry out joint planning. The determination of manpower requirements, the training requirements of graduates from technical schools, the coordination of health and welfare programs, community development and educational programs for out-of-school groups are examples of activities requiring inter-departmental coordination.

The Office of the Under-Secretary of State for Education

The Office of the Under-Secretary has the responsibility for overall management of the Ministry of Education through all its departments, provincial and regional offices, the districts and the individual schools. It coordinates program activities within the educational system and between the other divisions of government. Planning for overall educational development is the major responsibility of the Educational Planning Office, established in November, 1963. This office is within the Office of the Under-Secretary for Education. The Office of Under-Secretary for Education is divided into five divisions and an office, namely: 1) Central, 2) Finance, 3) External Relations, 4) Educational Information, 5) Cultural, and 6) an Educational Planning Office.

Khuru Sapha

All teachers in Thailand are required to become members of Khuru Sapha. This organization was created by law on January 9, 1945. The Minister of Education and the Under-Secretary of State for Education are ex-officio members and serve as chairman and vice-chairman of the Executive Board of Khuru Sapha. All directors-general are ex-officio members of the Board. The regulations stipulate that there shall be three more elected members than ex-officio members of the Board and that they will be elected by members of Khuru Sapha to serve four year terms. The Khuru Sapha, an office for the Secretary General which is responsible for the administration of its total organization. A primary responsibility of the Khuru Sapha is to advise the Minister of Education on matters dealing with curriculum, teacher welfare, etc. These activities are conducted through the Executive Board which performs the functions of the Civil Service Commission concerning teaching personnel. A Disciplinary Committee enforces special regulations which deal with teachers' behavior and moral standards. The regulations set for teachers are considerably more stringent than are comparable rules for other civil servants working under the Civil Service Commission. In addition, the Board approves the appointment, promotion, transfer and resignation of the teacher members. The Board is also in charge of raising academic standards for teachers, organizing in-service training courses and promoting teacher status and welfare.

Departmental Organization

The basic responsibilities of the departments consist of meeting the professional needs of the regional, provincial, district and local levels. The specialized professional staffs of the separate departments are organized to provide the technical services required. The departments provide the educational leadership and business management necessary for the lower levels of operation. The planning of innovations, curriculum adjustment, financial management, personnel administration, record collection and analyses are among the numerous responsibilities of the departments. The more specific responsibilities of the departments concerned with secondary education can best be shown by describing each department separately.

The typical personnel of a department within the Ministry of Education includes a Director-General, a Deputy Director-General, a Secretary and Chiefs of separate divisions. The number of divisions varies with the departments and is determined by the nature of the responsibilities of a particular department. The divisions, in most instances, are subdivided into sections; the number of these sections is directly related to the nature of the work to be accomplished by the division. The responsibility of supervision is delegated to the separate departments which have established supervisory units for the purpose. At the regional and provincial levels supervisory personnel are to be found also as part of the staff organization.

Department of Secondary Education

This department administers all public secondary schools and all private schools in the kingdom. It prepares, administers and processes

nationwide examinations in public and private schools for the certification of Maw Saw 5 (grade 12) graduates. It supervises the curriculum and method of instruction to provide the instructional content most suitable for the needs of the people and to assist teachers in giving quality instruction. The customary functions of budget preparation, constructural arrangements, legal matters, the gathering of statistical data, and maintenance of official records are included in the daily activities of the Secondary Education Department. Policy directives emanating from the Director-General are sent out through the channels of communication to the regions, provinces and district offices and then into the local schools.

There are six main divisions of this department, namely:

1) Office of Secretary,
2) Division of Government Schools,
3) Division of Private Schools,
4) Division of School Finance,
5) Division of Educational Evaluation and Examinations, and
6) the Supervisory Unit.

In addition, a pre-university school is under the direct supervision of the Director-General. Several groups are assigned to work on project coordination.

Secondary education is divided into two streams: the general stream is under the Department of Secondary Education and the vocational stream is the responsibility of the Department of Vocational Education.

Department of Vocational Education

The chief responsibility of the Department of Vocational Education is to develop and promote vocational education, to prepare young people for citizenship and to train semi-skilled workers for a changing agricultural and industrial economy. The department also cooperates with other government agencies and professional groups in establishing vocational education programs. The Department of Vocational Education is responsible for counseling prospective and enrolled students and for assisting students in job placement. Instruction is available to both boys and girls and to men and women. Training is offered in specialized areas that range from farming, homemaking, women's trades, and skilled industrial crafts to the full range of manpower requirements of a developing country. There are three levels of instruction provided in the vocational schools, namely: lower vocational level (grades 8-10); upper vocational level (grades 11-13); and technical institutes or junior college level (grades 14-15).

The Department of Vocational Education administers the instructional program of the vocational stream of secondary education. The general education subjects taught in the vocational curriculum are very similar in content to those found in the Secondary Education Department schools. The major difference in the curriculum lies in the purely vocational subjects leading to a trade or occupation. Although there is this close similarity between the curricula, students find difficulty moving back and forth between the two streams of secondary educations. Once a student enters a stream, particularly the vocational stream, he finds it difficult, if not impossible, to move back into the academic stream.

There is a need for a clearly stated policy regarding responsibility for technical and vocational training. Such a policy might designate all training for specific employment to be in the Department of Vocational Education; this requirement would include vocational and technical training now provided in grades 11-12-13 and 14-15. On the other hand, the Secondary Education Department might be made responsible for the practical arts and pre-vocational instruction which are preparatory courses to the selection of vocational pursuits.

Department of Educational Techniques

The Department of Educational Techniques provides professional assistance to the various departments in the development of curriculums, textbooks and teaching aids. It renders a consultative service to the Minister on current educational matters and issues. The preparation of lists of books approved for use in the schools is carried out by this department. It promotes the use of teaching aids on the part of classroom teachers and stimulates the teaching of science. To do this exhibits are maintained in Bangkok and at many other locations; for example, at regional educational offices and at the project schools throughout the Kingdom. This is a direct service to teachers and is aimed at curriculum enrichment and improved instruction and reaches the teachers through the regional and provincial education offices.

Department of Teacher Training

The responsibilities of this department which relate to secondary education are the following: 1) to train prospective teachers and to provide instruction in particular aspects of the secondary curriculum;

2) to organize and supervise in-service training programs for teachers already employed; 3) to conduct qualifying examinations for those who wish to upgrade their academic and professional status. The department also produces elementary school teachers whose training period is equivalent to grades 11 and 12 in the secondary school.

Department of Physical Education

The responsibilities of this department are: 1) to provide instruction leading to physical fitness; 2) to provide instruction in health standards and the physiology of the human body and its care; and 3) to train teachers for teaching physical education.

Regional and Provincial Organization

The purpose of establishing twelve regional education divisions in the country was to better adapt education to local needs as well as to geographical, occupational and cultural backgrounds found in particular regions. The main duties of each region are to develop educational responsibilities, improve education in the regional area, provide appropriate channels of control and coordinate the work of central departments and regional offices. In order to carry out the plan of adapting education to better fit local needs, the general curricula prepared by the Ministry of Education has been supplemented by syllabi prepared by the respective regions as particular needs seem to dictate.

There is coordination of effort between the Departments of the Ministry of Education and regional and provincial authorities in the distribution of manuals, pamphlets and teaching materials. Administrators

FIGURE 6

EDUCATIONAL REGIONS
AND
G.E.D. CENTERS

supervisors and teachers cooperate to secure the fullest development of the educational program within the region. The accompanying map (Figure 6) shows the composition of the 12 regions.

It should be noted that, within the provinces, the Provincial Governor has a controlling influence over all educational officials. His role as governor can be used to great benefit for educational development at the provincial level.

The Provincial Education Offices, of which there are 71 in the Kingdom, are responsible to the Office of Under-Secretary of Education. The director of the Provincial Education Office is appointed by the Under-Secretary. It is in this office that local education programs are administered. It handles personnel matters, such as salaries, records, employment arrangements and health services. The financing of the school program within the province is the major responsibility requiring extensive record keeping, auditing and disbursement of funds. Contracts are drawn and supervised in this office. In addition to the above responsibilities, the Provincial Education Office has a supervisory function over all schools in the province. The inspection of facilities, teaching content and practice are the important responsibilities in connection with private schools. With regard to the adult education program, this office provides extensive leadership and administrative services.

The Provincial Education Office is staffed with the following personnel: a Provincial Education Officer, an Assistant Provincial Education Officer, a disbursing officer, one or more accountants, and several clerks and supplementary staff members as they are required.

There are 3 to 5 supervisors in the office who supervise the primary school programs.

The Regional Education Offices, of which there are twelve in the Kingdom, serve several provinces as clearing centers, points of co-ordination and sources of supervisory services. These offices are responsible to the Office of Under-Secretary of Education. The staff of each is comprised of various representatives of the several departments of the Ministry of Education. The executive officer is the Regional Education Officer who is responsible to the Office of the Under-Secretary of Education. The other members of the staff are assigned to the office from local schools on a loan basis and assist with the clerical work.

The relationship of the Regional Education Office to the Provincial Education Office is that of coordination and communication. The regional office is more closely related to the local project schools regarding the planning, staff training and program appraisal.

The District Education Office, which is a sub-division of the provincial structure, is responsible for assisting with administrative deals with individual schools, both public and private, gathering statistical data, supervising instruction, developing teaching materials, assisting with Boy Scout and Red Cross activities, and controlling finances. The District Education Office is a sub-division of the provincial educational unit. There are 574 districts in the Kingdom with an average of 7.7 per province. The district is determined by population density and geographical characteristics of the province. The District Education Offices are responsible to the Provincial Education Officer. The relationship of the District Education Office to the

Provincial Education Office is limited. The district office has practically no relationship with the Regional Education Office. It receives routine requests and communications from the provincial office in regard to disbursement of funds, personnel matters and other administrative details, but the major responsibility for these matters belongs to the Provincial Education Office.

Inspection and Supervision

The supervision of education is carried out by a network of regional and provincial inspectors. There are four Inspectors-General, each of whom is assigned to a section of the country: North Section, South Section, Central Section and Northeast Section. In addition to these Inspectors-General there are twelve Regional Education Inspectors, one for each of the twelve regions mentioned above. These officers also hold the title of Regional Education Officers and their offices serve provinces as clearing centers, points of coordination and sources of supervisory services. These officers are responsible to the Office of the Under-Secretary of Education. The staff is composed of various representatives of the several departments of the Ministry of Education. Some members of the staff are assigned to the office from local schools on a loan basis and assist with the clerical work.

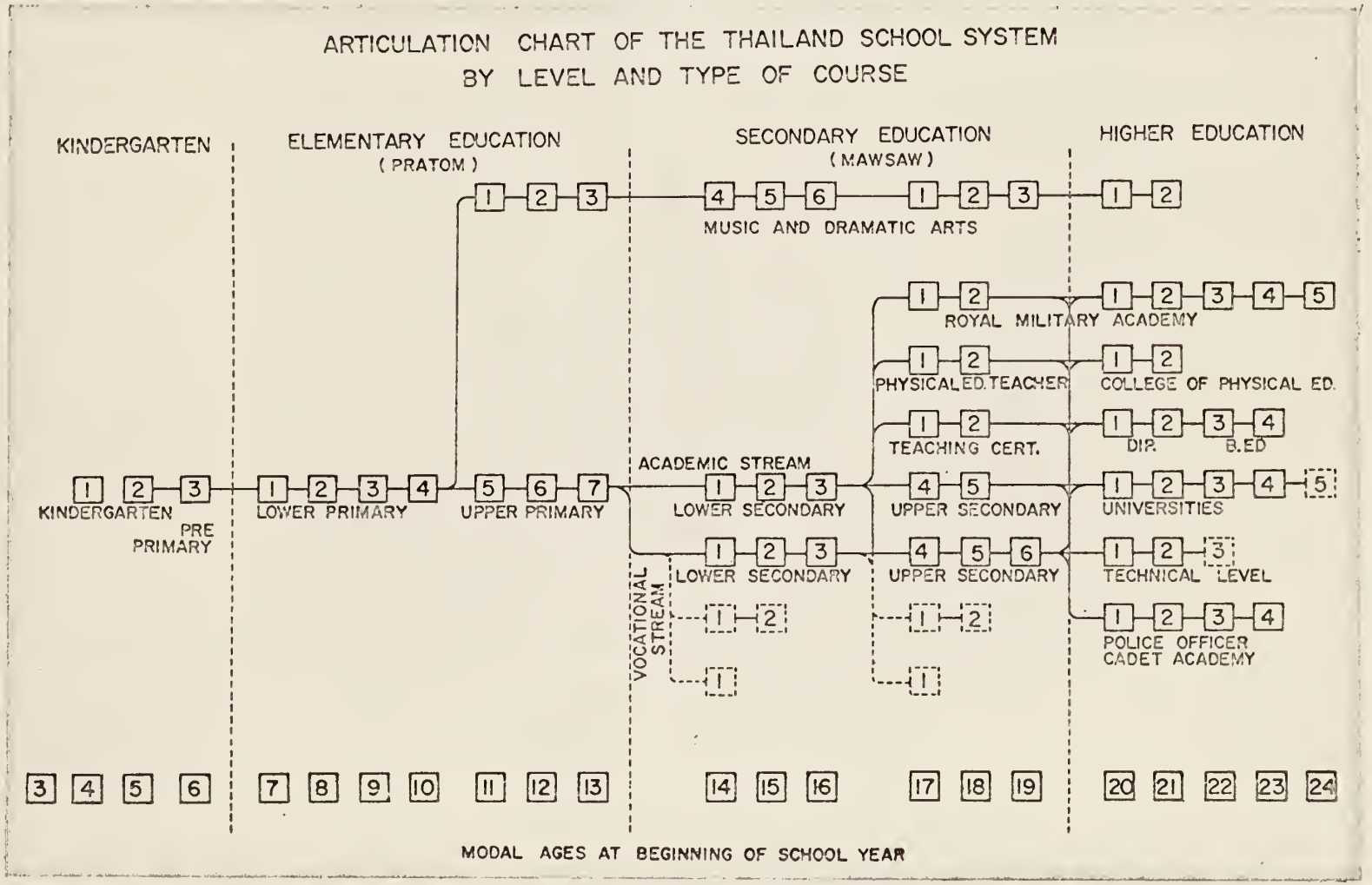
The Invisible Government

Organization charts and static descriptions of bureaucratic relationships do not convey a complete picture of any governmental agency. This situation is true whether the agency is part of the

governmental structure of Thailand, the United States or any country in the world. Organizations consist of individuals, and the reactions of individuals to one another are not always predictable. Whenever this human element enters into the picture, there are literally an infinite number of possible actions and reactions. What may at first appear on an organization chart of a direct line relationship with presumably fixed responses may indeed camouflage a myriad of possible courses of action. This variability and unpredictability of response should temper one's assessment of any institutionalized organization.

Yet another factor complicating the understanding of any organization is the latent patterns of relationships that exist. An organization chart may show individual A to be far removed in the chain of common form individual Z. But in fact the two may have very close and frequent interaction because they are close personal friends, they are relatives, they are both friend of individual Y, or because of many other reasons that they are or cannot be expressed on a chart. In Thailand particularly the pattern of family relationships may play a very decisive part in influencing administrative behavior. This is further complicated by a very strong hierarchial pattern among those with titles royalty. Some achieve high status, some are ascribed high status, and others attain their position by an undefinable combination of the two. The net result is that the entire bureaucratic power structure is a complex blend of personal, aristocratic and official relationships. So ones knowledge of any organization is always incomplete. The gaps in this knowledge partly close as one acquires increasing perception of the informal, as well as the formal, organizational patterns.

FIGURE 7


ARTICULATION CHART OF THE THAILAND SCHOOL SYSTEM
BY LEVEL AND TYPE OF COURSE
KINDERGARTEN
ELEMENTARY EDUCATION
(PRATOM)
SECONDARY EDUCATION
(MAWSAW)
HIGHER EDUCATION
1 2 3
KINDERGARTEN
PRE PRIMARY
1 2 3 4
LOWER PRIMARY
5 6 7
UPPER PRIMARY
ACADEMIC STREAM
1 2 3
LOWER SECONDARY
4 5 6
UPPER SECONDARY
1 2 3 4 5
UNIVERSITIES
VOCATIONAL STREAM
1 2 3
LOWER SECONDARY
4 5 6
UPPER SECONDARY
1 2 3
TECHNICAL LEVEL
1 2
1
1 2
1
4 5 6
MUSIC AND DRAMATIC ARTS
1 2
1 2 3 4 5
ROYAL MILITARY ACADEMY
1 2
PHYSICAL ED. TEACHER
1 2
COLLEGE OF PHYSICAL ED.
1 2
TEACHING CERT.
1 2 3 4
DIP. B.ED
1 2 3 4
POLICE OFFICER CADET ACADEMY
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
MODAL AGES AT BEGINNING OF SCHOOL YEAR

The School System

The Introduction of the School System

The first school in the modern sense was set up in the Royal Palace by the command of King Chulalongkorn in 1871, three years after he came to the throne. That school was intended to be a sort of training ground for future government officials, and it was only for the sons of princes and government officials. The school was called government school. However the credit for setting up the modern school system must be traced back to King Mongkut (1851-1868) who was King Chulalongkorn's father. King Mongkut was a brilliant Pali scholar who spent about twenty-seven years in the priesthood before he became King. While a priest he also studied Latin and English with an American missionary, Dr. Bradley, and in 1862 he employed Mrs. Anna H. Leonowens as governess for his own children, one of whom was King Chulalongkorn. Mrs. Leonowens taught English to the Royal family for five years, and wrote two books: "The English Governess at the Siamese Court" and "The Romance of the Harem". These two books have had a series of successful reincarnations in print and on the stage and in the films.

The first school taught Thai language, arithmetic and the routine management of a government office. The students were given clothing and free luncheons by the King, and the teachers were instructed not to beat the students or use bad language. Soon after the setting up of the first school, the King commanded that another school be opened in the Palace especially for the teaching of the English language, with Mr. Francis George Patterson, an Englishman, as a teacher. In 1884 the Suan Kularb Palace School was established where both Thai and

English were taught. In the same year several schools for the people were opened in many temples in Bankok as well as in the provinces, originally with the priests as teachers, and with the special instruction that those schools should use the six textbooks prescribed for the Palace School. The Department of Education was set up on May 6, 1887, and on that date there were 34 schools directed by the Department with 81 teachers and 1994 pupiles. From this very small beginning progress was rapid and on April 1, 1892, the Department became the Ministry of Education. Much has happened since then.

The School System

Thailand has had compulsory education since 1921. Under the Primary School Act of that year, parents were compelled to begin to send their children in their seventh year to primary school until they reached their fifteenth year or finished Grade 4. It took about thirty years before the objective of that Act could be put into full effect, but Thailand is now moving another step further by building more and more primary extension schools from Grade 5 to 7. The citizens hope to extend the period for compulsory education to Grade 7 local by local. This procedure has to be done gradually as the budget permits, and it is expected that the whole country will have such schools within twenty years. With some luck Thailand may extend the period of compulsory education within the next ten years.

With regard to the present school system before the University level, the general organization is 7-5, i.e., seven years of elementary education, and five of secondary education. But to describe

the education system in full, the general pattern is

2	-	4-3	-	3-2	-	4
Pre-School		Elementary		Secondary		University

The discussion will now deal in more detail with the different types of schools.

a. Pre-Primary Education

There are two types of pre-school education. First there is the kindergarten schools, both public and private, which admit children ages 3-5, and the course is two years before the students go to Grade 1. Secondly, there is an infant or a pre-primary class attached to a public primary school. Such kindergarten classes admit children when they are 5, and the course is one year before they go to Grade 1.

Generally speaking, the public kindergarten schools have a good reputation, and their teachers have teaching certificates. They also provide school lunches, which parents have to pay for. Many of them also have Grades 1-4, and some parents and teachers would like to see the kindergarten schools cover Grades 5-7 as well. If that comes about, it is clear that they would be no longer called kindergarten schools; and as there has been some criticism of public kindergarten schools as being only for the rich, the Ministry has had to lay down as a principle that the objective of the public kindergarten schools is merely to set up a standard for private schools; in the future there will be only one public kindergarten school in each province.

The statistics in 1963 show that there are 1559 kindergarten classes with 39,025 pupils divided among different types of schools, namely:

6,047	in public kindergarten schools
796	in demonstration schools attached to Teachers Colleges
543	in schools for handicapped children
34,152	in private kindergarten schools
15,553	in public primary schools

This must seem very confusing to point out that the equivalent to the kindergarten in the U.S. is the infant or pre-primary class attached to a public primary school.

b. Primary Education

Elementary Education is divided into two sections: four junior grades (Grades 1-4) and three senior grades (Grades 5-7). Both junior and senior grades may be located in the same school, or in separate schools. The first four junior grades are compulsory. The lower section is sometimes described as primary, and the upper as primary extension. As has been pointed out earlier, it is the policy of the Government to extend the period of compulsory education, hence Grades 5-7 are being added to existing primary schools which make them complete elementary schools from kindergarten to Grade 7, but there are also primary extension schools which have only Grades 5-7. Thailand began to open primary extension schools ten years ago and at present their number is 1368.

There are some facts about the public elementary schools which may be of some interest to know. First, English is taught as a second language from Grade 5 up to the University. As has been mentioned before, King Mongkut was very much interested in the study of English.

He foresaw that countries are inter-dependent, and in order that peoples of different nations can understand each other, common languages are essential. He chose English as one of the most common languages and from his time down to the present day, English has been taught in our schools, but for the higher classes French, German and Chinese are also taught. This situation does not mean that the standard of English in our schools is high. In a very few schools the standard is good, in some it is fair, but in many it is miserable. It is not surprising to find that after many years of instruction in English, the students are very poor in that language. There are many reasons for this, one of which is the fact that many teachers of English do not speak English themselves. They can read, write and know some rules of grammar, but they have very little chance of speaking English.

Another interesting fact about the public elementary schools is that Thailand has 22,781 public elementary schools, and the rate of increase is about one school per day. The number of children in these schools is 3,256,496 or about one-eighth of the total population. In regard to the teachers, their number is 89,535 and about 23% of them are women.

There is a large number of public elementary schools in almost every village, and it is very difficult to supervise them all. They are arranged into groups, each group consisting of 5-10 schools. There are frequent meetings of the principals of the schools in each group to exchange ideas and to help each other in the development of their own schools.

There are also special schools for the Blind, the Deaf, and special teachers for the crippled. Another interesting feature of the public elementary school system is that it has a boarding school for children whose parents live in cargo boats which move up and down the Chow Phraya River. There are also three boarding schools for children in remote areas where there are no school facilities. The policy of the Government is to have one such school in each of the twelve regions. These boarding schools are free, and it is hoped that some of the children will eventually become teachers in the future schools which will be set up in their home villages.

c. Secondary Education

There are two types of secondary schools which admit children who finish Grade 7, namely, academic high schools and vocational high schools. Thailand is also experimenting with comprehensive high schools, but the progress moves slowly, for it is costly and requires a new type of organization with a bigger and better qualified staff. It is also rather difficult to break away from the academic high school system which is firmly established and popular with the people.

Before 1939 all schools were under one department called the Department of Education, but in that year all vocational schools were placed under another department which eventually became the Department of Vocational Education. At the present day our high schools are under separate departments: the academic high schools are under the Department of Secondary Education, and all vocational schools are under the Department of Vocational Education. This arrangement is not

entirely satisfactory and many people would like to see all high schools placed under the Department of Secondary Education.

The Academic High Schools

The academic high schools consist of two sections: the lower section has a three-year course, i.e., Grades 8-9-10 and the upper section has a two-year course, i.e., Grades 11-12. In the Thai language the three grades in the lower section are called Mathayom Suksa 1-2-3, and the two grades in the upper section are called Tream-Udom Suksa 1-2.

At present some high schools have only the lower section, i.e., Grades 8-9-10. In the Bangkok area there are 30 high schools with three grades, and 29 schools with five grades; in the provinces there are 257 high schools with three grades and 72 high schools with five grades. It is likely that in the future all high schools in the Bangkok area and those at the provincial level will become complete high schools with five grades; however, most of the high schools at the local level will have to be content with three grades until there is more money available and more teachers. Another interesting fact about our high schools is that generally we have separate schools for boys and girls, and in almost every province there will be four high schools: two academic high schools for boys and for girls, and two vocational schools for boys and for girls. But at the local level there is coeducation, for generally there is only one high school in a local community and as there are no vocational school at the local level, it is likely that the local high school may be developed into a comprehensive type high school in which vocational subjects are also taught.

The exception to the general plan as described above is the pre-university school which has only Grades 11-12 and admits both boys and girls. The standard of teaching in this school is considered very high, and students who finish Grade 10 in other schools often try to get into the pre-university school in preparation for a scholarship to study abroad or to continue their study in a university.

There are big problems concerning the academic high schools. First, in spite of a continual effort, there are still not enough schools for children who want to get into them. Parents also like to send their children to academic high schools which may lead to a university education. Usually there is an entrance examination, and those who fail to pass will have to go to private or vocational schools or leave school altogether. Secondly, there is a worry that there is a growing number of students who finish high schools but cannot continue their education in higher institutions. For the girls the situation is not as bad for they can stay at home and help their parents in household work, but the boys have to go out and get employment, and as they are not trained to work and there are few jobs available for them, many become unemployed and create a social problem; that problem is confronting Thailand today.

The Vocational High Schools

The vocational high schools generally consist of two sections, each section offers a three-year course. There are also vocational schools which offer short courses in various subjects of not more than one year, e.g., hair waving, hair dressing, refrigerator repairing, signboard painting, motor repairing, electricity, blocking, dress

making, leather work, watch repairing, masonry, food preserving, carpentry, painting, plumbing, stenography, accountancy, typewriter and photography. In the Bangkok area there are vocational schools of different types; namely, four engineering schools, three building schools, three commercial schools, one arts and crafts school, one tailoring school and one foreign language school. The latest addition is a polytechnic school which offers many short courses.

In almost every province, the general pattern is that there is one vocational school for boys and another for girls. Most vocational schools for boys emphasize the teaching of carpentry and simple building construction, while those for girls teach home economics and women's crafts.

These vocational schools at one time took children who finished Grade 4, but with the improvement of primary education and the vocational schools themselves, they now take only children who finish Grade 7. There are now 81 vocational schools for boys with 10,317 pupils, and 71 vocational schools for girls with 12,411 pupils.

There are also 19 agricultural schools in different parts of the country.

There is much trouble involved in the operations of vocational schools. To begin with they started very low, receiving children who had finished only Grade 4. They are also short in equipment and well-qualified staff. Moreover many parents did not think too highly of vocational schools; they felt that these led to a dead end and that there was little future for those who entered vocational schools; hence, they preferred to send their children to academic high schools.

Now thanks to I.C.A., SEATO and the Governments of Germany and Japan, conditions are beginning to change for the better. In 1952, the Bangkok Technical Institute was established with the help of USOM and had a contract with Wayne State University. It offers a five-year course after Grade 10 in auto mechanics, radio, electricity, building construction, carpentry, metal work, machine shop, accounting, secretarial training, retailing, tailoring, home economics, surveying, printing, photography, and industrial arts. There is also an extra one-year course for those who want to take up vocational teacher education.

The Bangkok Technical Institute proved very popular with the students and parents alike, and four more technical institutes have since been opened in Songkla, Koraj, Chiengmai, and Thonburi.

In 1958 a Seato Project was sponsored by the U.S. Government and the Ministry of Education signed a contract with the University of Hawaii. The length of the contract was from November 6, 1958, to April 30, 1963. The contract allowed thirty man years of technical assistance and a provision was made for twenty-four participants to study in Hawaii. A Vocational Development Center was set up at Wat Thepnari in Bangkok with six shops in radio-telecommunications, electrical machine shop, auto mechanics, welding and sheet metal, and building construction. Nineteen province vocational schools are now being developed under this project.

In 1959 two more projects were set up by use of foreign aid. The Government of West Germany helped in establishing the Thai-Germany Technical School Project by providing tools and equipment to be used in the training of skilled labor in four areas: auto-mechanics,

building electrician, welding, and machine shops. In the same year the Japanese Government assisted in the establishment of the Telecommunication Training Center. The project is aimed at preparation of technicians for telephone exchanges and for training in telegraph, wireless, telecommunication, carrier telephone, cable and microwave techniques. Students selected to be trained in this school must be graduates of the Postal and Telegraph School of the Ministry of Communication.

TABLE 1

Class Hours per Week, Academic Stream (MS 1–3)

Subject	Class Hours per Week
Thai	4
English	4 or 6
Social Studies	4
Science	3
Mathematics	5
Health	2
Fine Arts[1]	2
Practical Arts (Industrial arts, agricultural arts, home–making arts, etc.)[1]	6 or 4
TOTAL	30

In addition to the regular requirements, a school must arrange weekly an extra hour at the minimum for such extra–curricular activities as Boy Scouts, Junior Red Cross, etc.

A minimum of one half hour per week must be devoted to a general meeting or to religious practice according to the opportunity and local conditions.

TABLE 2

Class Hours per Week, Academic Stream (MS 4–5)

Subject	Course						
	Science		Arts		General		
	Common Required Subjects	Specific Required Subjects	Common Required Subjects	Specific Required Subjects	Common Required Subjects	Specific Required Subjects	Elective Subjects
Thai							
Thai A	3	–	3	–	3	–	–
Thai B	–	–	–	2	–	–	2
English							
English A	4	–	4	–	4	–	–
English B	–	2	–	2	–	–	2
English C	–	–	–	2	–	–	2
Social Studies							
Social Studies A	3	–	3	–	3	–	–
Social Studies B	–	–	–	2	–	–	2
Science							
General Science	–	–	–	4	–	4	–
Science	–	8	–	–	–	–	–
Laboratory Work	–	2	–	–	–	–	–
Mathematics							
Mathematics A	2	–	2	–	2	–	–
Mathematics B	–	4	–	4+	–	–	4
A Second Foreign Language	–	–	–	4+	–	–	4
Arts or Crafts	–	2	–	2	–	2	–
Commerce	–	–	–	–	–	–	4
Secretarial Work	–	–	–	–	–	–	4
Vocational Subjects	–	–	–	–	–	–	4 or 6
Total	12	18	12	18	12	6	12
Grand Total	30		30		30		

TABLE. 3

Population Projection for Thailand, by Age Group, 1965–1986
(in millions)

Year	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 44	45 – 64	65 & over	Total
1965	5.779	4.793	3.946	3.114	2.597	7.304	3.328	0.892	31.752
1966	5.968	4.955	4.080	3.258	2.686	7.509	3.431	0.931	32.819
1967	6.165	5.124	4.220	3.410	2.779	7.720	3.538	0.972	33.928
1968	6.370	5.301	4.365	3.569	2.876	7.938	3.649	1.015	35.082
1969	6.583	5.484	4.516	3.735	2.976	8.164	3.765	1.086	36.282
1970	6.804	5.674	4.673	3.909	3.080	8.397	3.884	1.107	37.530
1971	7.051	5.861	4.826	4.056	3.224	8.643	4.014	1.154	38.829
1972	7.308	6.055	4.986	4.208	3.375	8.895	4.149	1.203	40.182
1973	7.577	6.256	5.152	4.368	3.533	9.157	4.289	1.254	41.586
1974	7.856	6.466	5.324	4.534	3.699	9.428	4.435	1.304	43.050
1975	8.148	6.684	5.504	4.707	3.873	9.709	4.587	1.364	44.574
1976	8.467	6.923	5.702	4.856	4.019	10.040	4.749	1.414	46.170
1977	8.800	7.173	5.906	5.011	4.170	10.384	4.920	1.468	47.832
1978	9.148	7.432	6.112	5.173	4.329	10.742	5.097	1.523	49.564
1979	9.511	7.704	6.344	5.340	4.495	11.114	5.282	1.580	51.368
1980	9.891	7.987	6.577	5.513	4.668	11.500	5.474	1.640	53.248
1981	10.252	8.278	6.818	5.715	4.839	11.922	5.674	1.700	55.197
1982	10.628	8.582	7.068	5.924	5.016	12.358	5.882	1.762	57.217
1983	11.018	8.896	7.326	6.141	5.180	12.810	6.097	1.827	59.311
1984	11.420	9.222	7.594	6.366	5.390	13.279	6.320	1.894	61.482
1985	11.840	9.559	7.872	6.598	5.587	13.764	6.552	1.962	63.732
1986	12.270	9.909	8.160	6.840	5.792	14.268	6.792	2.034	66.065

Source: National Statistical Sffice.

TABLE 4

Enrollment Trends (Pratom 1–7) Including Public and Private Schools
1956–1964

Year	Pratom 1	Pratom 2	Pratom 3	Pratom 4	Pratom 5	Pratom 6	Pratom 7
1956	1,220,289	756,396	606,048	474,179	96,176	80,820	69,005
1957	1,247,350	791,351	641,031	508,731	104,887	91,108	74,476
1958	1,281,649	837,204	689,244	560,530	125,460	102,397	88,811
1959	1,294,846	846,612	714,267	582,107	134,985	115,612	96,564
1960	1,336,521	880,034	747,812	605,228	137,850	121,050	107,054
1961	1,322,820	947,985	788,816	657,313	137,054	126,115	112,651
1962	1,307,618	965,768	852,506	678,024	138,605	122,749	115,012
1963	1,339,673	968,989	868,028	728,024	156,443	122,826	106,901
1964	1,285,482	1,083,083	912,830	777,475	180,422	144,245	114,325

TABLE 5

Enrollment Trends (Maw Saw 1–6) Including Public and Private Schools
1956 – 1964

Year	Maw Saw 1	Maw Saw 2	Maw Saw 3	Maw Saw 4	Maw Saw 5	Total (Maw Saw 1-5)	Maw Saw 6*
1956	56,562	42,152	32,816	13,830	10,013	155,373	2,227
1957	68,339	51,358	39,185	20,324	12,595	191,801	3,148
1958	76,960	62,294	49,558	26,329	18,729	233,870	4,386
1959	87,893	70,577	56,892	29,386	23,782	268,530	6,797
1960	93,732	77,578	66,366	31,248	25,131	294,055	8,569
1961	98,125	81,744	72,024	38,621	25,442	315,956	9,344
1962	97,220	86,306	75,574	39,399	29,043	327,542	7,210
1963	96,641	86,725	82,739	43,835	27,046	336,986	7,868
1964	95,681	88,366	82,719	48,634	32,531	348,931	6,741

* There are vocational students only in this grade.

TABLE 6

Enrollment Projection (Pratom 1–7) Based on Past Trends
Including Public and Private Schools 1965 – 1986
(in thousands)

Year	Pratom 1	Pratom 2	Pratom 3	Pratom 4	Pratom 5	Pratom 6	Pratom 7
1965	1,291	1,017	1,015	637	192	158	135
1966	1,312	1,027	966	926	214	176	147
1967	1,339	1,036	970	888	245	197	165
1968	1,373	1,089	979	890	246	226	184
1969	1,399	1,133	1,026	898	255	228	211
1970	1,429	1,170	1,067	939	265	234	214
1971	1,462	1,210	1,103	978	286	216	219
1972	1,496	1,253	1,141	1,010	307	264	230
1973	1,556	1,297	1,181	1,045	291	284	247
1974	1,578	1,365	1,223	1,082	349	303	266
1975	1,606	1,403	1,285	1,120	371	322	283
1976	1,644	1,446	1,323	1,176	405	343	302
1977	1,685	1,496	1,363	1,213	427	374	321
1978	1,727	1,551	1,411	1,249	452	395	349
1979	1,771	1,608	1,462	1,292	477	418	370
1980	1,817	1,667	1,515	1,386	506	441	391
1981	1,864	1,730	1,572	1,439	555	468	413
1982	1,930	1,776	1,630	1,493	591	512	438
1983	2,000	1,838	1,675	1,535	628	547	479
1984	2,072	1,904	1,790	1,637	661	581	512
1985	2,147	1,973	1,859	1.703	719	611	544
1986	2,225	2,045	1,627	1,765	765	664	572

TABLE 7

Enrollment Projection (Maw Saw 1–6) Based on Past Trends,
Including Public and Private Schools 1965 – 1986
(in thousands)

Year	Maw Saw 1	Maw Saw 2	Maw Saw 3	Maw Saw 4	Maw Saw 5	Total (Maw Saw 1–5)	Maw Saw 6*
1965	102	72	84	49	35	342	10.4
1966	120	99	87	50	36	391	10.6
1967	132	115	94	52	37	430	11.4
1968	146	128	109	56	40	477	11.8
1969	160	141	121	64	41	527	12.7
1970	181	155	133	72	51	591	13.0
1971	182	174	147	79	56	638	16.3
1972	184	177	165	87	62	675	18.0
1973	190	179	169	98	70	705	19.8
1974	202	185	171	100	71	728	22.3
1975	214	195	176	101	72	758	22.8
1976	226	208	186	104	74	798	23.0
1977	239	219	197	110	78	843	23.7
1978	252	231	208	117	83	891	25.1
1979	271	244	220	123	88	946	26.6
1980	284	263	232	130	93	1,001	28.1
1981	298	276	249	137	98	1,058	29.7
1982	312	289	262	147	105	1,115	31.3
1983	329	304	275	155	111	1,172	32.2
1984	356	318	288	163	116	1,241	33.9
1985	378	344	303	170	121	1,316	35.6
1986	399	366	327	179	128	1,397	37.2

* There will be vocational students only in this grade.

TABLE 8

Budget of the Ministry of Education
By Departments and by per cent of Total Budget
1959 – 1965
(฿ in thousands)

Year	Department									Total–All Departments	Per cent Change
	Office of the Under Secy.	Elem. and Adult Ed.	Secondary Education	Vocational Education	Teacher Training	Physical Training	Education Techniques	Fine Arts	Religious Affairs		
1959	61,578	813,905	194,843	94,973	66,233	10,384	2,470	9,128	14,224	1,267,742	–
	(4.86%)	(64.20%)	(15.37%)	(7.49%)	(5.22%)	(0.82%)	(0.19%)	(0.72%)	(1.12%)	(100.00%)	
1960	50,450	822,241	186,458	89,986	59,530	5,800	1,700	9,197	11,000	1,236,365	– 2.48
	(4.08%)	(66.50%)	(15.08%)	(7.28%)	(4.82%)	(0.47%)	(0.14%)	(0.74%)	(0.89%)	(100.00%)	
										(1,368,207)[2]	
1961[1]	56,732	665,077	153,945	69,769	47,090	8,057	1,687	15,891	8,904	1,026,155	+ 10.66
	(5.53%)	(64.81%)	(15.00%)	(6.80%)	(4.59%)	(0.79%)	(0.16%)	(1.55%)	(0.87%)	(100.00%)	
1962	64,460	952,770	230,961	109,982	62,247	16,720	2,420	19,577	11,285	1,470,425	+ 7.47
	(4.38%)	(64.80%)	(15.71%)	(7.48%)	(4.23%)	(1.14%)	(0.16%)	(1.33%)	(0.77%)	(100.00%)	
1963	79,904	1,047,497	247,489	122,555	66,129	22,506	9,046	30,287	15,762	1,641,178	+ 11.61
	(4.87%)	(63.82%)	(15.08%)	(7.47%)	(4.03%)	(1.37%)	(0.55%)	(1.85%)	(0.96%)	(100.00%)	
1964	59,422	1,136,062	247,253	135,804	79,975	30,282	9,649	44,666	14,334	1,757,451	+ 7.08
	(3.38%)	(64.64%)	(14.07%)	(7.73%)	(4.55%)	(1.72%)	(0.55%)	(2.54%)	(0,82%)	(100.00%)	
1965	56,505	1,225,661	256,929	156,864	82,375	56,208	3,261	52,870	14,305	1,904,982	+ 8.39
	(2.97%)	(64.34%)	(13.49%)	(8.23%)	(4.32%)	(2.95%)	(0,17%)	(2.78%)	(0.75%)	(100.00%)	

1–1961 Figures are for 9 months only.

2–Total for 12 months.

Sources: 1. **The Proposed Legislation of Expenditure Budget**, Fiscal Year 1955 – 1964.
2. **Budget in Brief** Fiscal Year 1962, Bureau of the Budget, Office of the Prime Minister.
3. **Budget in Brief,** Fiscal Year 1965, Bureau of the Budget, Office of the Prime Minister.
4. **Educational Statistics 1954 – 1960,** Department of Educational Techniques, Ministry of Education, p. 1.

CHAPTER III

FACTORS AFFECTING DESIGN

The Climate

Thailand, a part of southeast Asia, stretches from 6^{o} to 20^{o} north of the Equator. Generally, the weather is warm and humid, but the continual heat is moderated by the cooling inland breezes which occur during the evening. Temperature consistency, high humidity and heavy rainfall are characteristic of the country.

Because Thailand is not far from the Equator, the temperatures remain constant, varying only about 30^{o} throughout the year. Daily temperatures vary between 70^{o} F and 80^{o} F, being usually about 10^{o} F to 15^{o} F cooler in the northern area. Yearly temperatures vary little more and are in the same range.

Prevailing Winds

Thailand is influenced by two seasonal winds, the Southwest and the Northeast Monsoons. The Northeast Monsoons, which come across the China Sea and the Gulf of Tan Kin, are the strongest winds. These winds prevail from October to February. The Southwest Monsoons prevail from March to September. They bring with them gentler winds and the heavier rainfall. The two monsoon seasons are separated by two transitional periods, lasting about two months.

Consequently, buildings are usually oriented to the south to catch maximum breezes and to provide cross ventilation during the months of summer.

Humidity

The yearly average humidity of Thailand varies little; it is between 75% to 85%. The humidity in Bangkok varies daily from 55% to 95%, averaging usually about 80%.

Because of the high temperatures, humid climate, and heavy rainfall, most buildings are built very open with overhangs and sunshades to cut the glare, the hot sun and to protect the rain.

Weathering of Building Materials in the Warm Humid Tropics

Metal

Metallic corrosion occurs as a result of condensation and contact with dissimilar metals. Rapid disposal of water, adequate ventilation and drainage are important. Protective coating may also be used to minimize corrosion.

Ferrous Metals and Zinc

Ferrous metals and zinc where are not satisfactory in humid tropical climates near the sea coast. (east and southern part of Thailand). The use of an aluminum coating for steel preservation is recommended.

Aluminum and Its Alloys

Susceptible to marine atmosphere, but pure aluminum of "alcad" is most corrosive resistant.

Copper and Its Alloys

Brass and bronzes are satisfactory for reasonable usages in the tropics.

Concrete and Cement Products

Cement is prone to deterioration by premature hydration and hence storage presents special difficulties. For the exterior or open area use, it is satisfactory.

Concrete Tiles, Asbestos Cement Sheets

Concrete tiles, asbestos cement sheets are susceptible to intense blackening in the tropics if there is a high rainfall. The stain is mainly due to the presence of algae. Painting with oil bound or cement paints will prevent the onset of the stain.

Concrete Blocks

Concrete blocks are quite satisfactory in the tropics, by use of ventilation, sun control, protection from rain, and they are both simple and economical.

Clay Products

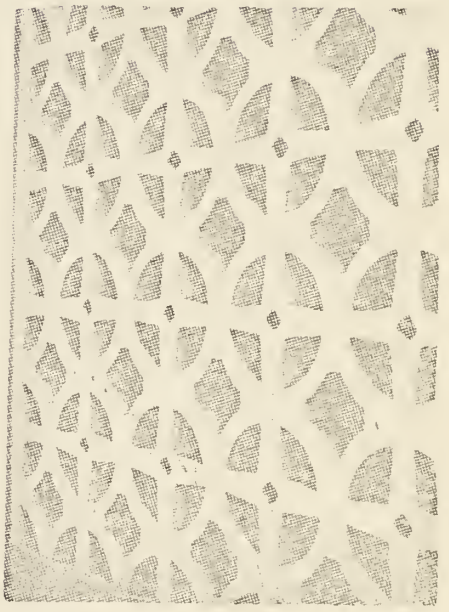
Burnt clay products are not prone to any abnormal deterioration because of the climate influences.

Glass

Glass deteriorates rapidly in the tropics; recrystallization of the alkaline constituents in the glass surface takes place.

PLATE I

"obsolate" glazed
terra-cotta grilles

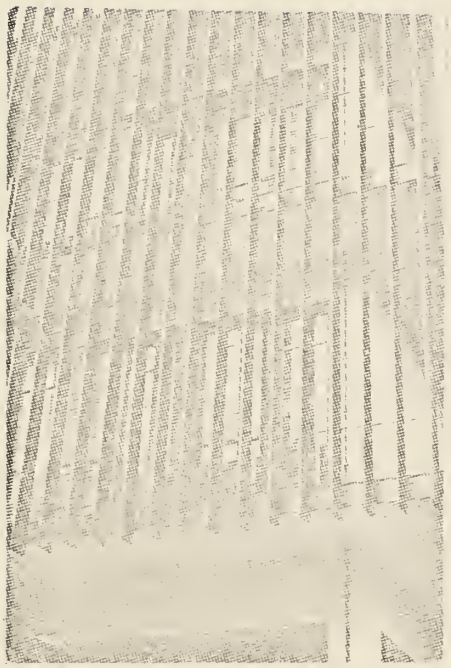


Pre-cast concrete grilles

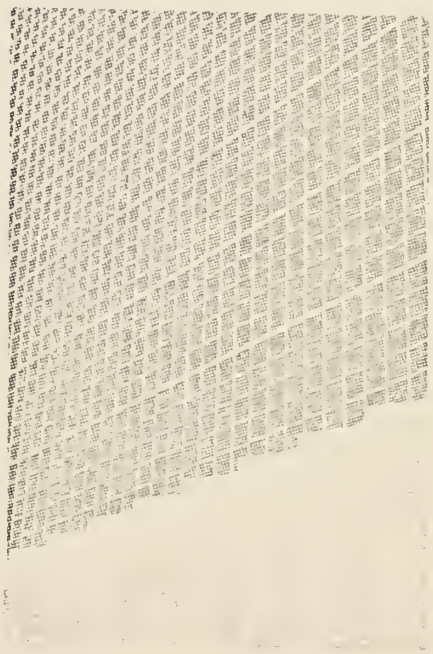
Pre-cast concrete grilles

PLATE II

Horizontal concrete louvers

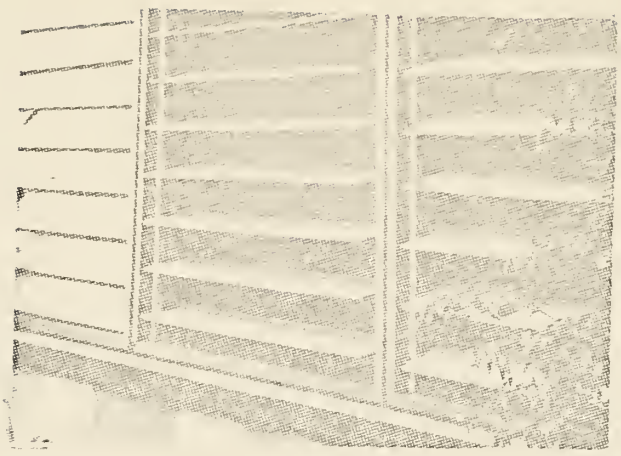


Vertical sun-breakers or louvers



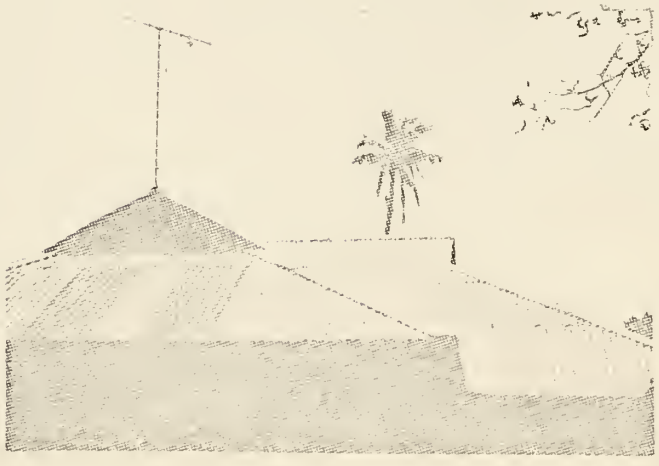
Aluminum grille and marble slabs

PLATE III



Use of horizontal glass louvers

Local made tiles



The use of corrugated aluminum sheets

Timber and Related Materials

Timber and related materials are often regarded as a less permanent and durable. These materials may fail because of mechanical wear, the action of heat and dryness, chemical decomposition, and attacks by fungi and insects. The weathering of timber uses in Thailand is unimportant since it can be treated with creosote oil and fuel oil. The durability depends on the species, the relative humidity, and shading of lodged water, and good ventilation.

Bituminous Materials

Bituminous materials fail through cracking and crumbling owing to oxidation and polymerization by sunlight and is therefore more serious in the tropics.

Paints

Paints fail because of photochemical action, thermal radiation, heating and cooling, wetting and drying, moisture penetration and micro-organisms. The main factor, however, is poor workmanship. Aluminum pigmented paints are quite satisfactory in the tropics.

Building Materials

Timber

Timber used locally comes mainly from the Thai forests, such as northern part and southern part of Thailand. Some are cheap (Yang) and reasonably strong (Teng) for formwork.

Teak, which is transported from northern part of the country, is of better quality, but more expensive.

Reinforced Concrete

There are five cement manufacturers in Thailand. Local made cement bricks and other cement products are widely used.

Sand and Granite

Sand and granite is of good quality and adequate

Clay Products

Owing to the abundant supply of local clay, there are various brick kilns in Thailand. Exposed brickwork is seldom used because of the poor quality. Face bricks, however, are more expensive.

Steel

Thailand imports all her building steel supply from Japan, Belgium, Germany, Britain.

Corrugated Galvanized Iron

Corrugated galvanized iron is widely used for roofs and fences in more economical buildings.

Asbestos Cement Sheet

Asbestos cement sheet is used for ceilings in more economical buildings.

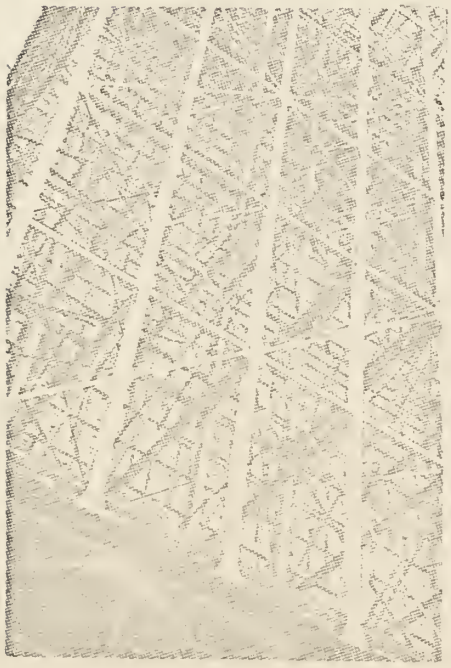
Plywood

Plywood is very popular; it can be used for both interior and exterior purposes depending on their duties and different kinds of textures.

PLATE IV

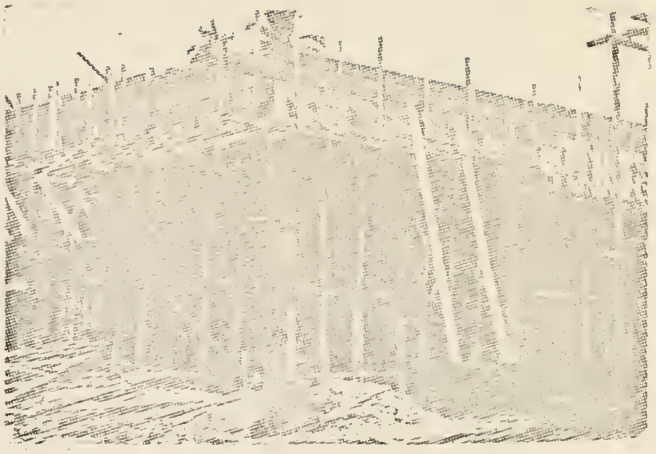
Cement tiled roofing

Corrugated asbestos cement roofing



Steel frame construction

PLATE V

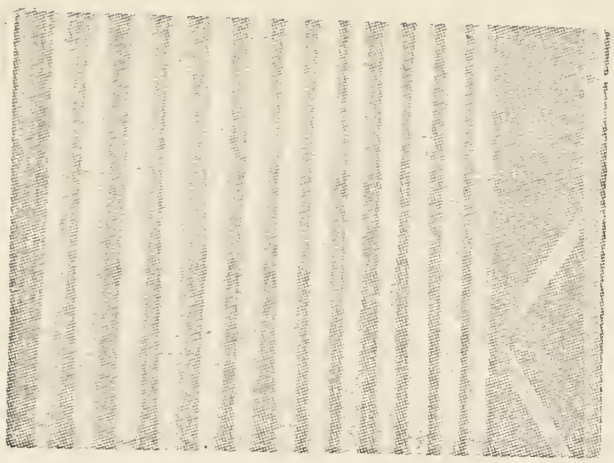


Reinforced concrete structure

Local product bricks

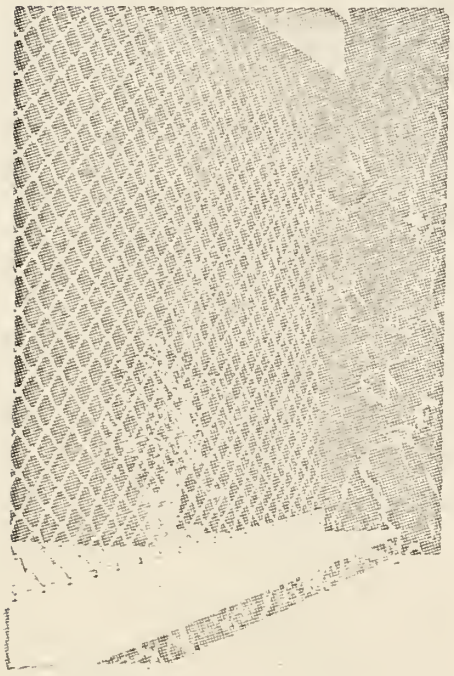
The use of glass for display windows

PLATE VI

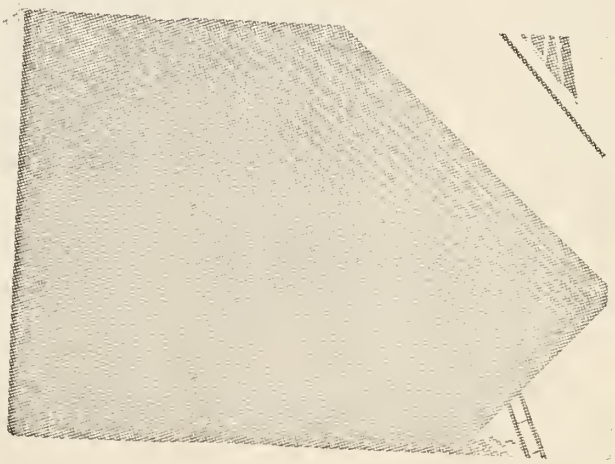


Local made bamboos screen

Saw-dust chio boards



Steel-chain fence



Wood battened ceiling

Finishing Materials for Flooring

Terrazzo, mosaic tiles, red quarry tile, glazed tiles and parquetry teak floor are commonly used. Italian marble is also used but only for commercial and prestigious buildings.

Building Factor

Building Techniques

Modern building techniques are employed in Thailand. Pre-stressed concrete, however, is used only for bridge building. Shell structures are becoming popular. Reinforced concrete footings, wood pilings are usually used in domestic work, and reinforced piling with cap is used in large structures. Reinforced concrete flat roofs are popular with hollow block ceiling against solar heat. Pre-cast concrete vents or grills are used for ventilation between rooms. Large roof gutters and drains covered with grill work are used to dispose of rain water.

The most common form of construction is reinforced concrete frame on poured reinforced concrete footings, which is found to be quite satisfactory used in poor soil constructions. Concrete framing is commonly used in every phase of building.

Labor

Because of the cost of living, Thai labor, both skilled and unskilled, is cheap, but the quality of workmanship is of a good standard.

Square Meter Cost

The square meter cost of school buildings varies, depending on the structure, materials and finishes used, particularly if an unconventional design is contemplated.

It is reasonably safe to estimate a cost of $75 (American dollars) per square meter (unfurnished) in Bangkok. School buildings have been built at a cost of approximately 1500-2000 Bahts ($75-100) per square meter.

Public Services

Water Supply

Water supply is by the Water Works Department, Municipality of Bangkok. Charges are based on bulk system.

Electricity

Available from the Central Electricity Board, Electricity Organization of Thailand. Standard electricity supply is of the 220 volt, 3 phase, 50 A.C. current. Connection to the mains is controlled by the Electricity Department of the Organization.

Gas

Gas usually comes in tanks, but it will be available from the mains in the next few years.

Refuse Disposal

Refuse disposal are:

a. Combustion in incinerators

b. Disposal by the Municipal Workers and Cleaning Department. Wrought iron bins of 10 cubic feet (2' x 2' x 2'6") are provided and placed in convenient position for collection by the Department.

Sewage

Disposal is controlled by the Water Works Department through septic tanks on each site draining into the underground water.

Municipality of Bangkok Authorities and Building Regulations

The Municipal Architect: approves proposed building scheme

The Municipal Sewage Engineer: sewage system and engineering works

The Municipal surveyor: site surveys, etc., issues certificate of fitness for occupancy.

Building By-Laws (Bangkok): Building regulations and requirements.

Building By-Laws

Public Building

"Public building" means a building used or constructed or adapted to be used as a school, college, hospital, hotel, theater, church ... or used or constructed or adapted to be used for any other public purpose.

Open Area in Rear of

Public buildings, warehouses abutting a back lane shall have an open space inclusive of half of the back lane equal to 10%. Of the building on area and all such buildings shall be provided with quarters for a watchman and such quarters shall be provided with bathroom and latrine.

Detached House Boundaries

For a detached house there shall be at least two meters clear between the building and the boundaries of its plot.

Corridor Width

No corridor shall be constructed less than one and one-half meters wide.

Corridor Lighting

All corridors shall be efficiently lighted by openings to the external air.

Fire Escape

Every building used for manufacturing, trade purposes, or public assemblies shall be provided on every story with separate and adequate means of escape in case of fire as the Municipal Commissioners may direct.

Buildings of Iron or Glass

Buildings known as frame buildings or buildings made wholly or partly of glass, iron or other material not provided for in these By-Laws shall be subject to the approval of the Municipal Commissioners

in each particular case. Plans and specifications and calculations shall be submitted.

Projection of Footings

The projection at the widest part of the footings of every wall on each side of such wall shall be at least equal to one-half of the thickness of such wall at its base unless an adjoining wall exists, in which case the projection may be omitted where that wall abuts.

Width of Offset of Footings

The diminution of the footings shall be in regular offsets or in one offset at the top of the footings and the height from the bottom of the footings to the base of the wall shall be at least equal to two-thirds of the thickness of the wall at its base, the lowest footing to be at least two courses high. No one course offset shall project more than 70 centimeters beyond the course above it.

Every Building to Have a Separate Approach

Every building not abutting on a street shall have a right of way for an approach from the street open to the sky and at least 6 meters in width.

Thickness of Walls in Public Buildings

Every wall of a public building or godown shall be constructed of the following thicknesses:

a. In buildings 7 meters high or under, the thickness of the wall shall be 30 centimeters throughout.

b. In buildings from 7-12 meters high, the thickness of wall shall be 40 centimeters for the first story, 30 centimeters all above.

Height of Story

No story of public building or godown shall be less than 3 meters and shall be over 6 meters high without the permission in writing of the Municipal Commissioners who may in every such case prescribe to what extent the walls shall be increased in thickness or otherwise strengthened.

Thickness of Cross Walls

The thickness of every internal cross wall shall be at least two-thirds of the thickness prescribed for an external or party wall of the same height and length, provided that if such cross wall supports a load the whole of such cross wall shall be of the thickness prescribed for an external or party wall and all cross walls shall be bonded to the main walls to which they abut.

Walls, Openings In

Every building having an extent of opening in any external wall which is greater than one-half of the vertical face or elevation of that wall or of the story in which the opening is left, shall be constructed with such piers of brick or other supports of incombustible material and so disposed as to be sufficient to carry to the superstructure.

Reinforced Walls

Approved reinforcement properly tarred and sanded and bedded in cement or other suitable bondings shall be built in the walls where required by the Municipal Building Surveyor.

For a floor intended to be used for purpose of	Equivalent dead load in Kilograms per sq. m.
Classrooms in school buildings	500
Offices	450
Churches	500
Lecture rooms	500
Public assembly	500
Workshops	500
Domestic buildings not hereinafter	300

Staircase Not Less Than 1 Meter Clear Width

Every main staircase shall be not less than 1 meter clear width with not more than 17.5 centimeters risers and not less than 20 centimeters going.

Handrails and Exits

All staircases shall have proper handrails and balusters, and shall be situated in such portion of a building as will reasonably afford the best means of exit in case of fire and shall be adequately lighted.

Building 20 Meters Deep to Have Two Staircases

All buildings 20 meters or more in depth abutting on a street shall have at least one staircase in addition to the main staircase not less than 1 meter wide, from uppermost floor to the ground floor.

Staircases to be Enclosed by Brick Walls

The floor of every lobby, corridor passage and landing and every flight of stairs and all supports of such floor and flight of stairs in every public building and business premises shall be constructed of incombustible and fire-resisting material.

Gable to be Vented

All external gables shall be provided with sufficient openings to promote circulation of air.

Room, Ventilation of

No room in any building shall be a greater depth than 12 meters unless it is sufficiently lighted laterally, or at both ends, by one or more openings free of any obstruction and communication directly with the external air. Where one airwell is provided it shall not be less than 12 square meter for three story buildings, but in such cases no single airwell shall have a less area than 5 square meters, of unobstructed daylight.

Area or Rooms

No room, used as a bed room, cubicles excepted, shall be of less than 14 square meters or less than 2.40 meters wide and when not cross ventilated not less than 16 square meters in area.

Width of Buildings

No domestic building shall have a less width than 4.80 meters in the clear, such width to be measured at ground floor level between walls of any shop house or terrace house. For corner sites 3.50 meters in the clear.

Height of Stories

No ground floor story shall hereafter be constructed of less than the following height measured vertically from floor to ceiling.

a. In buildings other than outbuildings, 3 meters

b. In outbuilding consisting of:

1. Rooms other than bathrooms or latrines, 2.50 meters

2. Bathrooms or latrines or both, 2.20 meters

On upper story shall hereafter be constructed so as to be less than 2.50 meters in height measured vertically from floor to ceiling.

Height of Buildings

The height of any building, measured to the top of the wall plate above the center of the street, not being a domestic building in a business or office area abutting on a street, may not exceed in height one and one-half times the width of the street except with the sanction of the Municipal Commissioners.

The decision of the Municipal Commissioners as to whether an area is a dwelling house area or business or office area shall be final.

CHAPTER IV

DESIGN CONSIDERATIONS IN HUMID TROPICAL CLIMATES

The Use of the Solar Chart

The position of the sun as seen by an observer can be fixed in terms of two angles. The solar altitude is the vertical angle between the horizontal plane and a line from the observer to the sun. The sun's azimuth is the horizontal angle between a line from the observer to the sun, and a line running through north and south through the observer's position. The values of these two angles at any time on any day can be ascertained by the inspection of the solar chart.

As the time marked on the charts are Apparent or Solar times, to convert the times on the chart to Thai Standard Time, add 45 minutes for Bangkok. Hence the vertical and horizontal angles at various times on June 22 in Bangkok will be

Thai Standard Time	Solar Altitude	Solar Azimuth
7:45 a.m.	16	67
9:45 a.m.	42	59
11:45 a.m.	65	33
1:45 p.m.	65	329
3:45 p.m.	43	300
5:45 p.m.	16	294

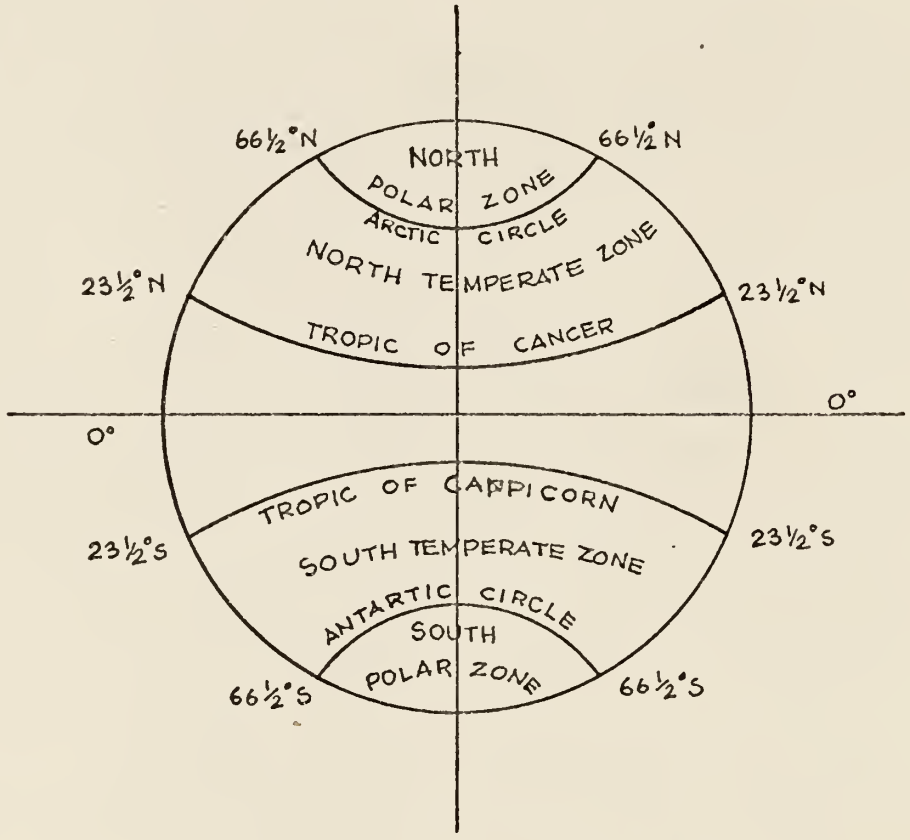


FIGURE 8

THE ZONE OF THE EARTH

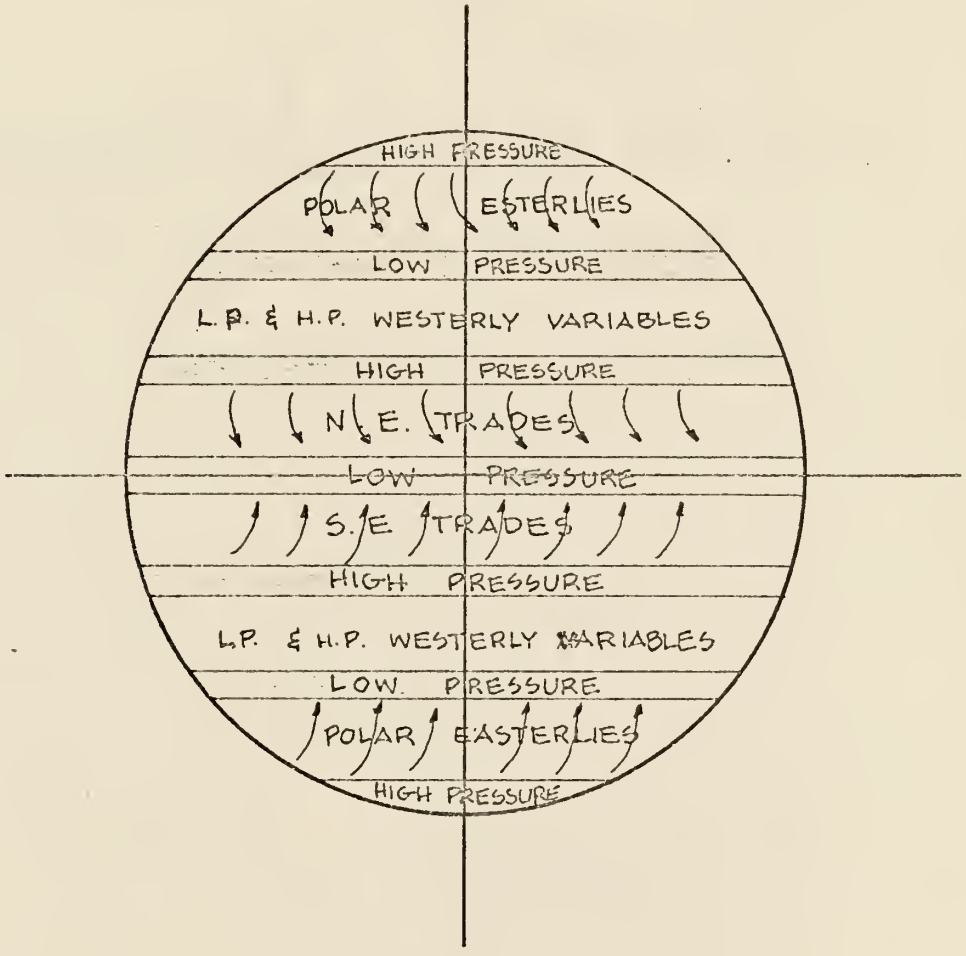


FIGURE 9

PLANETARY CIRCULATION OF THE WINDS

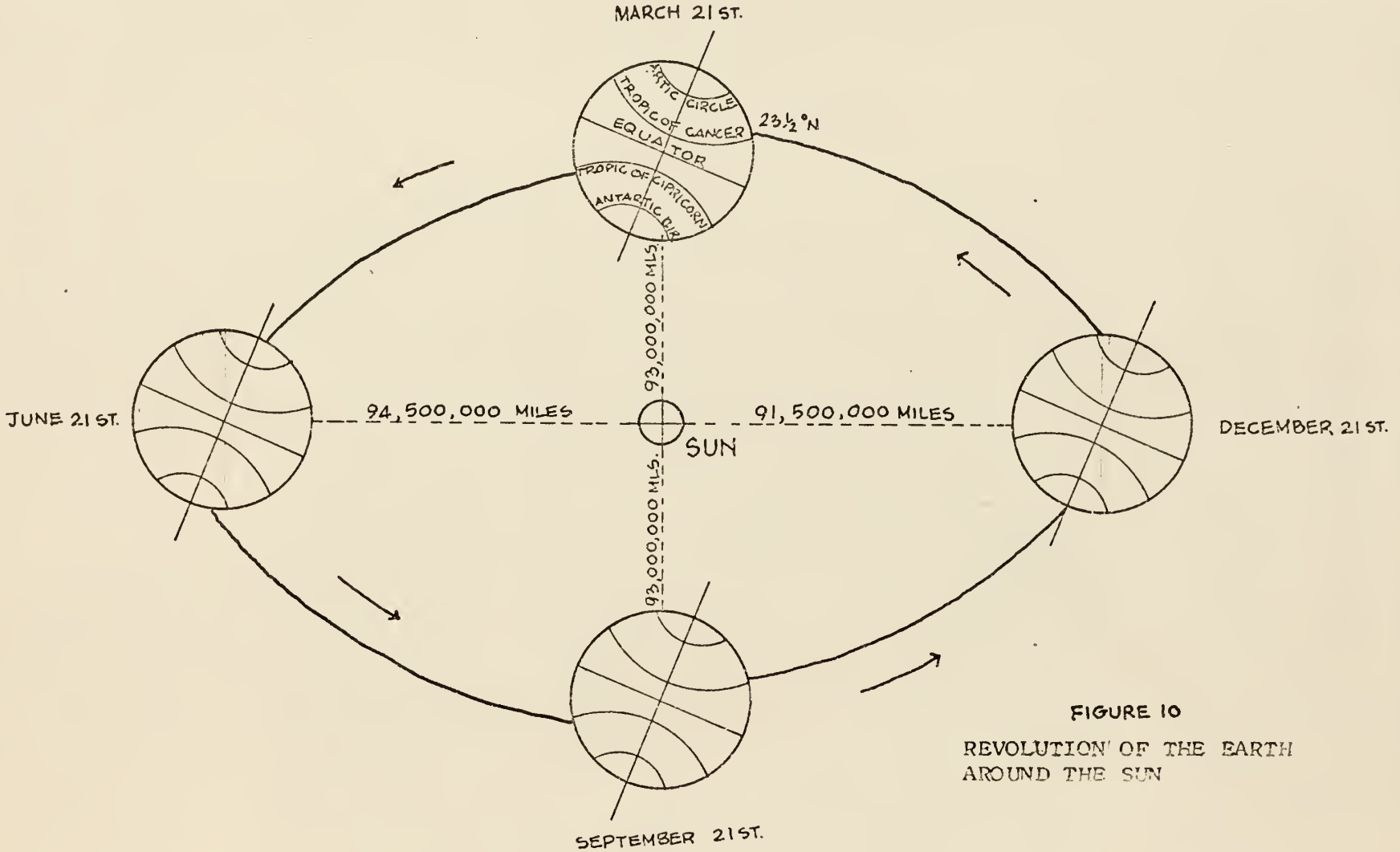


FIGURE 10

REVOLUTION OF THE EARTH AROUND THE SUN

The Use of the Solar Chart

Various angles can similarly be obtained for different times of the year.

Shading

In hot climates, it is of primary importance that all structures are oriented with this factor taken into account. Because of the high intensity of the sun's rays in the east and west sides of any building, the dimensions of these surfaces should proportionately be smaller than the surfaces facing north and south. To further prevent uncomfortable heat transference through the east and west walls, these surfaces should be shaded by natural vegetation and/or mechanical devices expressly designed for this purpose. This shading may be achieved in a number of ways, four of which are the following:

a. Overhanging eaves and balconies
b. Sun-break devices, such as canopies, pergolas , and vertical louvers screens
c. Light slabs or light weight top roofs to shade subordinate flat roofs
d. Natural vegetation, such as plants, trees, and shrubs.

Reflectivity

Another factor which may be taken to prevent heat absorption is reflective surfaces. For this purpose light colors are preferrable to dark colors.

Ventilation

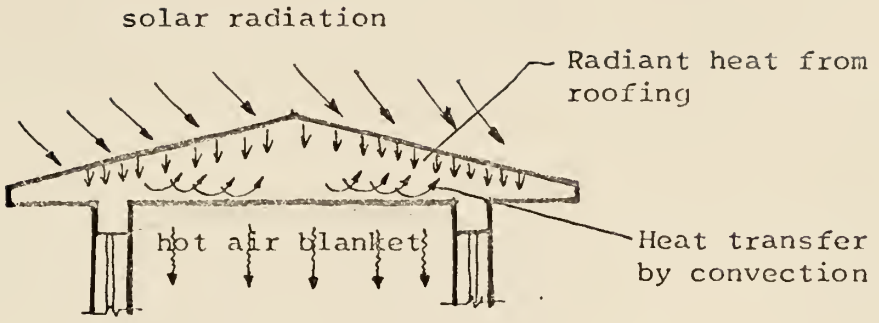
The expensiveness of air-conditioning makes its use impractical; therefore structures must be designed and constructed with this ventilation taken into consideration. Openings and wall cavities should be constructed wherever possible to allow for the best ventilation possible to prevent the stagnation of roof air. Solid walls should be kept at a minimum, and should be replaced by walls with large screened openings, louvers, and open balconies which should be shaded from the sun's direct rays.

In the designing of school, all measures possible should be taken to prevent direct sun from entering the building and to obtain natural ventilation. All the measures mentioned above should be taken in order to achieve these objects.

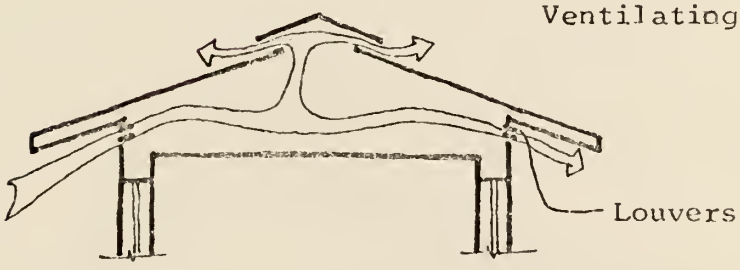
Thermal Capacity

Special consideration must be given to the choice of materials and the design of roof surfaces because of their orientation toward the sun. Basic measures concerning materials and design may be taken to discourage extreme heat convection. Light roofing materials such as asbestos-cement, Brownbuilt, and zinc sheet on celocrete should be used because they have a minimum reservoir for heat. Where these materials cannot be used, or in addition to their use, large spaces to trap air which will act as insulation to prevent the downward transfer of heat from the roof to the rooms. This roofing insulation technique is commonly found in the traditional temples of Thailand, and it serves modern structures equally well.

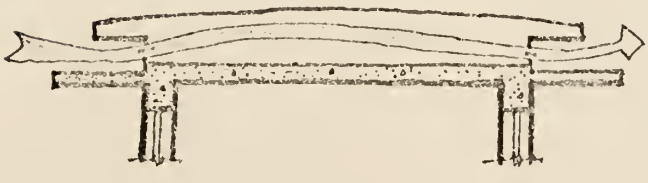
FIGURE 11



SOLAR RADIATION

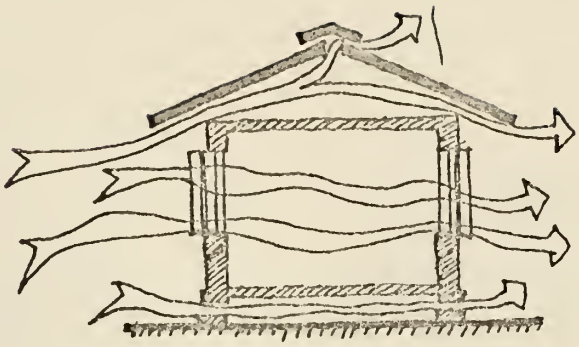


VENTILATION FOR TROPICAL CLIMATES

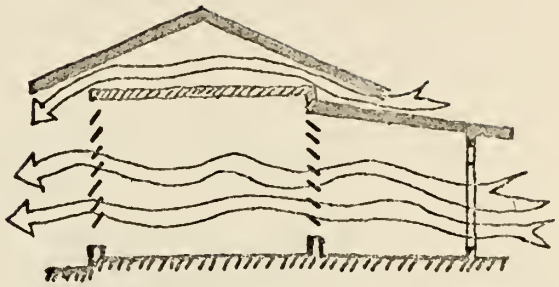


SHADING AND VENTILATION FOR FLAT ROOFS

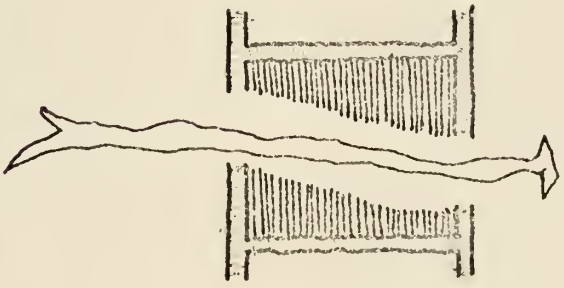
FIGURE 12



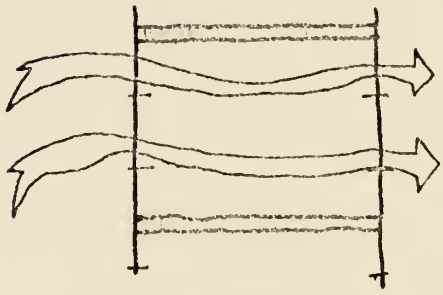
Free-air-movement alleviates discomfort



Large openings allow free air flow



Small openings create large dead-air spaces



Wide openings allow no dead-air pockets

DESIGN FOR HOT HUMID CLIMATES

Reference: Notes on "Science of Building", No. SB 1, see bibliography.

Natural Lighting

Because of physiological and economic factors, the most efficient lighting plan in Thailand is based on natural lighting sources. The natural light coming through windows, glass spacing, and skylights is influenced by weather variations and therefore there must be supplemented by artificial light.

The sun's direct heat can be modified by wide overhangs sheltering the windows or by sun controls. These overhangs and sun controls also protect the violent rains which occur often during the Monsoon season.

Glare

Sunlight, filtering through heavy low cloud formations, causes a glare problem. The human body can adapt partially to such problems, but this adaptation can be lessened if the problem is considered when the design is made and the building materials are chosen. Lack of such consideration in Thailand has often made the problem more acute.

Many measures should be taken to reduce glare when possible. Grass and shrubs should replace paved areas whenever possible. Where necessary, pre-cast screens of concrete and screens of timber, and other materials, etc. will be used to combat glare discomfort.

Disposal of Rain Water

Because of sudden heavy downpours in the region, the design shall take into account the efficient discharge of rain water collected from the roof.

CHAPTER V

SCHOOL DESIGN

Site

Pre-primary School and Primary School

The selected site of approximately 18 acres, including the existing soccer field, is located in a suburb east of Bangkok. It faces Sukhumvit Avenue on the north, Banklouy Road and a residential area on the south and the planetarium on the east. The site is flat with no existing structures.

Secondary School

The secondary school site is located immediately east of Bangkok. Approximately 35 acres in size, the site is bordered on the north by Pechburi Avenue and the east and west by residential areas. The south is bordered by a 50-foot wide canal which separates the side from a third residential area. This area is currently a lumber yard and is to be cleared as a residential, commercial or school zone.

Both sites have been chosen for the following reasons:

1. Convenient to both private and public transportation which runs along Sukhumvit Avenue and Petchburi Avenue.
2. Their relationships to neighboring residential areas.
3. Prevailing breezes from the south, especially cool air from the canal for the secondary school.
4. Availability of sufficient parking space and school play grounds.

5. Possibility for full horizontal expansion.
6. Congenial surroundings, not affected by undue disturbance of noise from public transportation or the surrounding areas.

Soil

The areas have been filled with a base of mining sand, then filled in with approximately ten feet of clay.

Reinforced concrete or wood piles could be suitably used.

PRE-PRIMARY AND PRIMARY SCHOOL SITE

PLATE VII

SUKHUMVIT AVE. (NORTH OF THE SITE)

LOOKING FROM NORTHEAST OF THE SITE

SECONDARY SCHOOL SITE

PLATE VIII

THE PLANETARIUM, EAST OF THE SITE

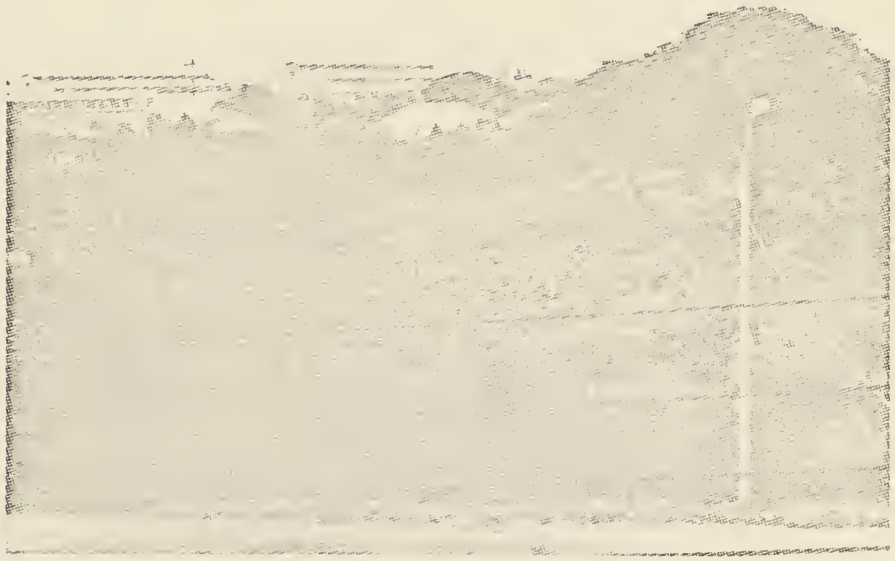
LOOKING FROM SOUTH

PLATE IX

SOUTH OF THE SITE

WEST OF THE SIDE

PLATE X



LOOKING FROM NORTH OF THE SITE

PLATE XI

SOUTH SIDE OF THE SITE

THE CANAL ALONG THE SOUTH SIDE

PRE-PRIMARY SCHOOL

Illustration pages 116-121

Pre-primary School

Playroom

It is best that the playroom have easy access to both the entry lobby and the outdoor play areas. The floor should be of a surface easily cleaned. Ample storage room for toys, books, and other materials used in class is needed along with lockers for each child's personal belongings. It is most convenient to have sinks, countertops, and all other fixtures the children will be using to be at a level suited to their height.

Director's Office

The director's office should have convenient access to a conference room. It should be close to the lobby or reception area.

Isolation Area

An isolation area with a lavatory and water closet could be part of the director's office.

Seminar-Conference Room

The seminar conference room will generally function as a discussion room for teachers and parent conferences. Because it will be used by members of the teaching staff and the public, it should have entry ways to the lobby and be next to the teachers' offices.

Teacher Office and Library

The teacher office and library will be used only by teachers and therefore should be removed from the passing ways of the children. It should be flexible for a variety of educational research needs. Men and women toilets should be made convenient to this area.

Kitchen

The kitchen should be separated from the playroom but with direct access to it. Storage area should include staff lockers, a janitor closet and a storage area located near the service entrance for ease of delivery.

Lobby

The reception area or lobby is provided for parents and visitors. It should have access from the parking area and the loading zone. Lavatories for men and women must be included in this area.

Multi-purpose Area

An area for several uses--recreation, dining, and/or sleeping is provided. Because its uses will be many, it should be located close to all other areas: the lobby, kitchen, playroom, and teacher-room.

Pre-primary School

The pre-primary school system in Thailand is comprised of the pre-kindergarten children age 3 to 4-1/2 years old and kindergarten 4-1/2 to 6 years old.

This pre-primary school will have an enrollment of 100 children, 2 pre-kindergarten classes 50 children, and 2 kindergarten classes 50 children.

Space Requirements

	Area/ Sq. ft.	No. of rooms	Unit sq. ft.
Pre-kindergarten:			
Play area (45 sq. ft./child)	1,125	2	2,250
Semi-open play area	800	1	800
Outdoor play area	4,000	1	4,000
Play equipment storage	100	1	100
Storage space	100	1	100
Water closet	100	1	100
Multi-purpose area	1,500	1	1,500
Kindergarten:			
Play area (45 sq. ft./child)	1,125	2	2,250
Semi-open play area	800	1	800
Outdoor play area	400	1	400
Play equipment storage	100	1	100
Storage space	100	1	100
Water closet	100	1	100
Multi-purpose area	1,500	1	1,500

	Area/ sq. ft.	No. of rooms	Unit sq. ft.
Administration:			
Reception and lobby	225	2	450
Director's office	150	1	150
Conference room	350	1	300
Teacher's room	150	2	300
Teacher's working area and library	300	1	300
Toilet	100	2	200
Storage	50	2	100
Isolation	100	1	100
Food preparation:			
Kitchen	250	1	250
Preparation	75	2	150
Storage	150	1	150
Toilet (lockers for staff and janitor)	150	1	150

Special Facilities

Administration Facilities

The administration area would consist of a principle's office, vice principle's office, secretary and registration office, general office, conference room, and storage area. This area serves as a reception area and therefore it should be located near the main entrance. Lavatories must be convenient to this area.

Health Suite

A health suite should contain facilities for medical examinations, dental examinations, first aid treatment, dressing, and resting. It must also have a reception area and a lavatory. The health suite could be part of the school building, in which case, it should be located near the administration office, or it could be in a separate building. In a larger school, the health area should also contain an operating suite.

Library

The library should contain ample space for an office, book checking, reading, card catalogues, audio-visual facilities, and work. It should have access to a loading and service area.

Teacher Rooms

The teacher rooms should include working areas, rest areas, and toilet facilities. These rooms should be connected to the administration office by an intercommunication system. They should be located among several classrooms. Such a location will make student-teacher contact convenient.

Classrooms

Obviously, academic classrooms present the center of the school scholastic program. Adequate lighting, ventilation, acoustic treatment, restful and pleasant colors, drinking fountains and ample toilet facilities, would make most comfortable wards. Furthermore, classrooms should be open to the outdoors as much as possible, so that the setting will be nature oriented.

PRIMARY SCHOOL

Illustration pages 122-124

Primary School

The pre-primary school in Thailand is comprised of the first, second, third, fourth, fifth, sixth and seventh grades. The first four grades are lower primary level and the fifth, sixth and seventh grades are upper primary level.

This primary school will have the enrollment of 490 students. Fourteen classrooms will accommodate all students.

Space Requirements

	Area sq. ft.	No. of rooms	Unit Sq. ft.
Administration:			
Lobby (reception and waiting room)	400	1	400
Principal's office	200	1	200
Vice principal's office	150	1	150
General office	300	1	300
Secretary and registration office	200	1	200
Conference area	150	1	150
Storage space	150	1	150
Public toilet	300	2	600
Library:			
Reading area	800	1	800
Outdoor reading	1,000	1	1,000
Storage and office	250	1	250

	Area sq. ft.	No. of rooms	Unit sq. ft.
Health suite	400	1	400
Classrooms:			
First to seventh grade 2 units for each grade	900	14	12,600
Storage space for each class	50	14	700
Multi-purpose area (assembly area)			
Hall	2,500	1	2,500
Stage	75	1	75
Music room:			
Instruction and practicing area	800	1	800
Office and storage	300	1	300
Student activities room:			
Space need	300	1	300
Teacher room:			
Working and resting area	600	2	1,200
Toilet	150	2	300
Cafeteria			
Dining area	3,000	1	3,000
Kitchen	600	1	600
Storage	200	1	200
Toilet and lockers for staff and janitor	150	2	300
Gymnasium:			
Corrective	4,000	1	4,000
Locker and storage	300	1	300
Outdoor playground--approximately 35,000 sq. ft.			

SECONDARY SCHOOL

Illustration pages 125-132

Secondary School

The secondary school in most school systems in Thailand is comprised of the eighth, ninth, tenth, eleventh and twelfth grades in system organized on a 2-(4+3)-(3+2) grade distribution basis.

This secondary school will have an enrollment of 1,050 students which is twice the students of the proposed primary school.

Space Requirements

	Area/ sq. ft.	No. of rooms	Unit sq. ft.
Administrative area:			
Lobby			
Principal	150	1	150
Vice principal	120	1	120
Mimeograph--current duplicating jobs	60	1	60
Reception--record of pupils	600	1	600
Storeroom	120	1	120
Conference	300	1	300
Custodian's closet	60	1	60
Health suite:			
Dental and medical	200	1	200
Reception	100	1	100
Rest room	50	2	100
Storage	60	1	60
Lavatories	60	1	60

		Area/ sq. ft.	No. of rooms	Unit sq. ft.
Toilet rooms:				
Boy's lavatory		300	4	1,200
Girl's lavatories		300	4	1,200
(provide entry of 50 sq. ft.)				
Arts and craft:				
Classroom--woodcarving, plastic, photography, painting, textile and pottery (storage included)		1,200	2	2,400
Cafetorium:				
Dining room		5,000	1	5,000
Kitchen		300	1	300
Storeroom		150	1	150
Office		60	1	60
Handwashing alcove	250 cubicals for books of pupils	25	2	50
Refuse	Garbage cans	75	1	75
Employee lockers and toilets		80	1	80
Service parking			2 cars	
Public toilet:				
Men		350	1	350
Women		350	1	350
Gymnasium:				
Boy's wing				
Office--files, books, magazines, records, supplies, and instructor's locker		300	1	300

	Area/ sq. ft.	No. of rooms	Unit Sq. ft.
Gymnasium--Continued			
Boy's wing--Continued			
Equipment storage	200	1	200
Custodian	100	1	100
Lockers	2,000	1	2,000
Shower	750	1	750
Toilet	250	1	250
Corrective and gymnastic	900	1	900
Girl's wing			
Office	300	1	300
Equipment storage	200	1	200
Custodian	100	1	100
Lockers	2,000	1	2,000
Shower	750	1	750
Toilet	250	1	250
Corrective	800	1	800
Conference	250	1	250
Academic:			
Classrooms (including math and social study	1,000	30	30,000
Language arts	1,200	2	2,400
Business education	900	2	1,800
Science:			
Physics	1,200	1	1,200
Chemistry	1,200	1	1,200
Biology	1,200	1	1,200

	Area/ sq. ft.	No. of rooms	Unit sq. ft.
Homemaking:			
Cooking laboratory	1,200	1	1,200
Sewing--fitting included	800	1	800
Dining	300	1	300
Teacher Core	2,000	4	8,000
Toilet	250	4	1,000
Music:			
Office	200	1	200
Practice room	500	1	500
Storage	200	1	200
Library:			
Reading area	2,400	1	2,400
Outdoor reading area	3,000	1	3,000
Office	150	1	150
Book room	350	1	350
Audio-visual aids	200	1	200
Storage	200	1	200
Work room	500	1	500
Service parking		1 car	
Shop:			
General shop	3,200	1	3,200
Metal	3,200	1	3,200
Wood	3,200	1	3,200
Mechanical drawing	2,400	1	2,400

	Area/ sq. ft.	No. of rooms	Unit sq. ft.
Auditorium:			
Main			
Stage	(capacity 1,000 people)		
Dressing			
Lavatory			
Lockers:			
For pupils	5,000	1	5,000
Custodian:			
Office	120	1	120
Storeroom and locker	240	1	240
Service:			
Maintenance shop	(use general shops)		
Control panels	(included in administration)		
Parking:			
Bicycle storage	100		
Faculty	50 cars		
Student	75 cars		
Public	100 cars		

Possible Structural Types

The major structural consideration is the spanning of large areas such as auditoriums, gymnasiums and cafeterias. Spans may be as large as 40-60 feet in width and 70-120 feet in length.

The Five Major Structural Types:

1. Wood frame
2. Steel frame
3. Concrete frame or shell concrete
4. Load-bearing wall and trussed roof.
5. Combinations of the preceding four.

Wood Frame

Wood frame, the most common, is used for small structures such as houses because of the lower cost of materials and labor. It is the least permanent due to the stress of heat and dryness.

Steel Frame

Steel frame construction is practically used for school buildings. The possibilities of the treatment of roofs--cladding, glazing, etc.,--are endless. The case of construction makes it economical.

Concrete Frame or Shell Concrete

Concrete is the most common type of structure used for current building construction. It is the most permanent for the climate of Thailand. The use of pre-stressed members can considerably reduce member sizes and render easier handling.

Load-Bearing Wall and Trussed Roof

This type was used extensively in the past but has been widely replaced by newer structural types. It is still used in some smaller buildings.

Combination Structures

Many "combination" possibilities can be developed through the use of steel frame with concrete. Masonry infill and load-bearing walls present suitable solutions to some problem structures. A combination of steel and timber or concrete and timber can be suitable for smaller buildings.

Acoustics

Architectural acoustics is basically concerned with two objectives:

The provision of good hearing conditions within a space by controlling the direction, impact, and duration of sound wave, and,

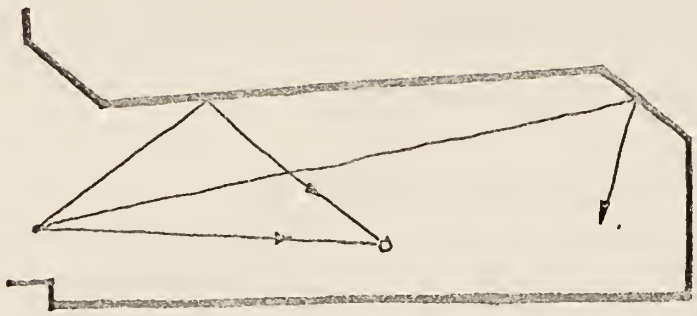
The provision of a satisfactory acoustical environment by raising barriers, originating outside the space.

Good acoustics in a building is not merely a matter of applying some patent sound absorbent materials to walls or ceilings, but are fundamental design of the building. Size, shape and volume are all important factors.

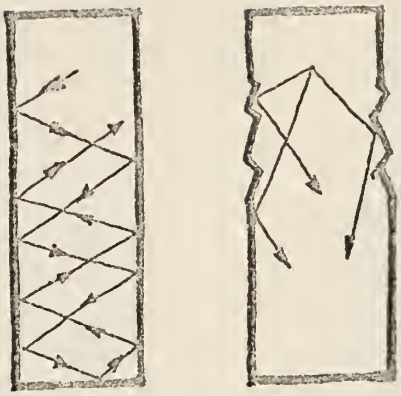
Flutter

Generally, typical classrooms are either square or rectangular. But these shapes have serious viewing and hearing limitations. Parallel walls may cause 'fluttering' to occur and therefore should be eliminated. Non-parallel walls will be used to improve visual and auditory conditions (see Figure 13).

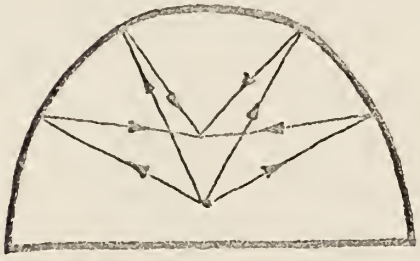
FIGURE 13



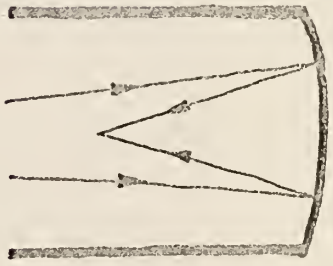
Sound reinforcement can take place by proper shaping of walls and ceiling. But reflected sound must not exceed direct sound by more than 65' 0" in its path of travel.



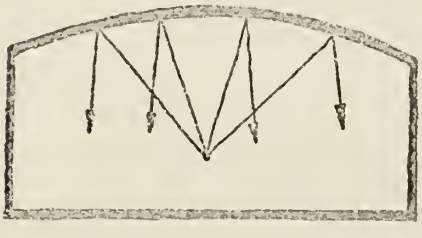
Long parallel unbroken walls produce flutter effect. Splayed surfaces correct this.



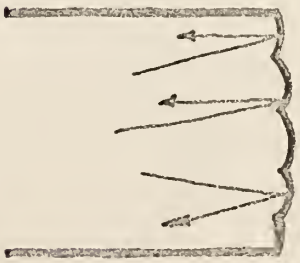
Center of curvature near F.L. produces severe focused effect.



Curved rear wall produces focused echo from source.



Radius of curvature more than twice ceiling height produces more even distribution.



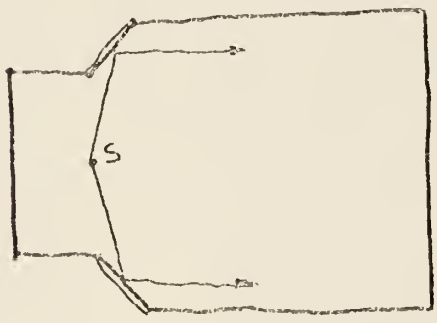
Focused effect can be broken up by irregular wall surfaces.

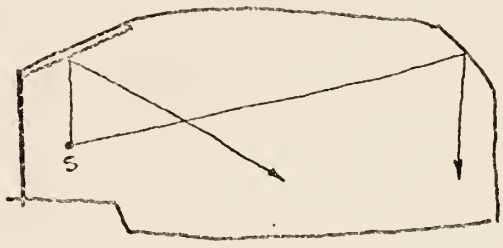
Echo and Blurr

Echoes will occur when the difference in sound path is in 65 feet. 'Near-echoes', sufficient to cause 'blurring', occur when the difference in sound path is between 35 and 40 feet. To prevent this problem, flat surfaces should be made about 70 per cent absorbent or, if also dispersive, about 50 per cent absorbent.

Sound Reinforcement

In a lecture theater or a large group classroom, a splayed overhead reflector and a horizontal reflective ceiling will provide adequate sound reinforcement to the rear of the room. In a similar manner, splayed sidewalls will reflect sound to side seats.





Resonance

In an auditorium which serves for both musical and oratory performances, the richness of musical tones requires special adjustments to be made. The acting surfaces, such as staging, stage apron, resonant reflector, and panelling, should be provided for adequate resonance. Depending on the resonant frequencies of the rooms, these surfaces will be constructed of a variety of materials and designs.

Reverberation Time

Reverberation is the natural and desirable persistence of sound by reflection from internal surfaces. The reflected sound follows the original sound so closely as to unite and be part of it. The reverberation time of a room must be such as to avoid excess overlapping of musical or speech, or speech sound, and yet be long enough to give life and color to music.

A reverberation time of 0.44-0.77 seconds with the loudness of 55 db. in the limit of 3 ft. of hearing a conversation gives satisfactory conditions for the semi-open classroom.

Reverberation time can be calculated by using the Sebin Formular:

$$R.T. = \frac{0.49\ V}{S\ \bar{\alpha}} \quad \text{where}$$

R.T. is measured in second

V = volume of room in cu. ft.

S = total surface area in sq. ft.

$\bar{\alpha}$ = average absorption coefficient which is derived from

$-2.30 \log_{10} (1 - \bar{\alpha})$ (when is less than 0.1).

By using sound-absorbing materials whose co-efficients are known, and those areas can be measured, it is possible to control the R.T. within certain limits.

Noise Transference

Insulation and isolation are usual ways of preventing the penetration of sound into a building. Noise (from work rooms and gyms) may be isolated in two ways:

a. structurally

b. spatially

The transference of sound by the ground, through the footings and into the structure can be reduced by setting the building as far from the source of noise as practicable, or by the construction of deep walls into the ground packed with sand on both sides to absorb the sound waves. The provision of adequate air locks and sound reducing wall surfaces should also be considered.

Dead Spots and Distortion

Echoes (reflection of sound after an interval of 1/17 of a second or more) must be eliminated, and the sound distributed properly throughout the room to give a high degree or acoustic uniformity to the greatest number of listeners. Room shapes play an important part in the formation of the acoustic properties. As a rule, concave surfaces are to be kept to a minimum. In large auditorium and halls where there is no gallery, end walls opposite to the stage should be treated with absorbent materials.

CONCLUSION

The school system of Thailand is much different from what it once was. Today there is the goal of educating as many of the population as possible, and this education consists of a longer and more sophisticated program. The schools which once sufficed are no longer sufficient. Thailand is therefore in need of more schools in which a wider age range of students will be taught.

Along with the need of a larger quantity of schools is the need of a certain quality of school. This quality must provide a harmonious relationship, between the building itself, the environment, and the country of Thailand. Successful architecture does not go against the reality of the situation of the environment. It does not need expensive, and often awkward, modern conveniences to make up for its shortcomings.

Thailand is a country with a humid tropical climate. It is also an agricultural country. Because Thailand cannot inexpensively provide appliances for lighting, air-conditioning, and ventilation, an architect must take advantage of the natural factors which the climate provides. For example, the sun will provide most of the lighting and the winds will provide cooling and ventilation. In Thailand it is not economical to adapt a building through mechanical devices; therefore, successful architecture should be self sufficient, without depending upon such products.

Architecture which sufficiently solves its functional problems will result in a work of pure and simple aesthetic value. Its beauty will be created by its functional success.

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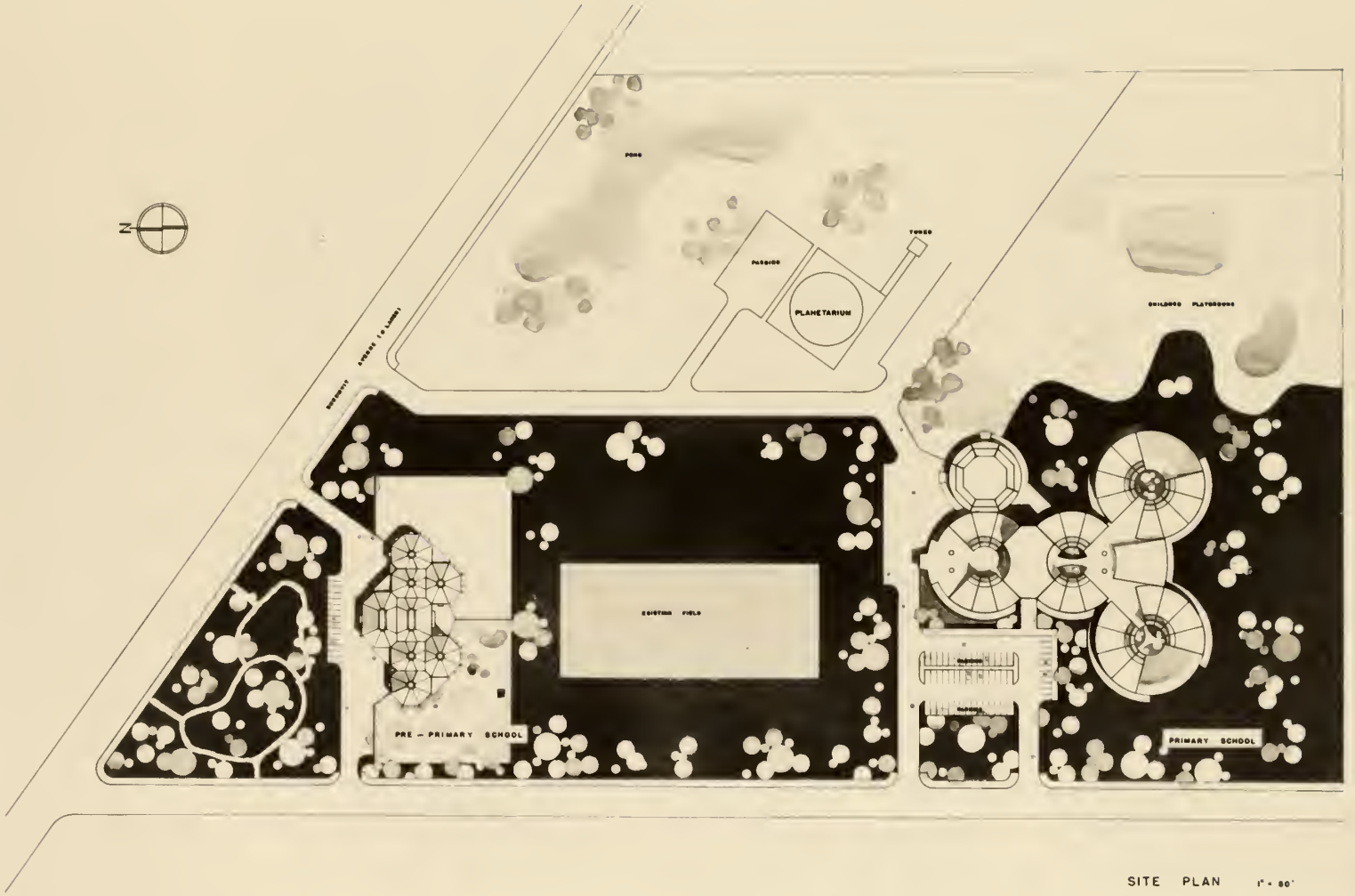
My sincere appreciation goes to Miss Susan Umberger who gave the advice and help in preparing this thesis.

THE DESIGN OF CONTEMPORARY SCHOOLS
FOR THAILAND
I. PRE-PRIMARY SCHOOL
II. PRIMARY SCHOOL
III. SECONDARY SCHOOL

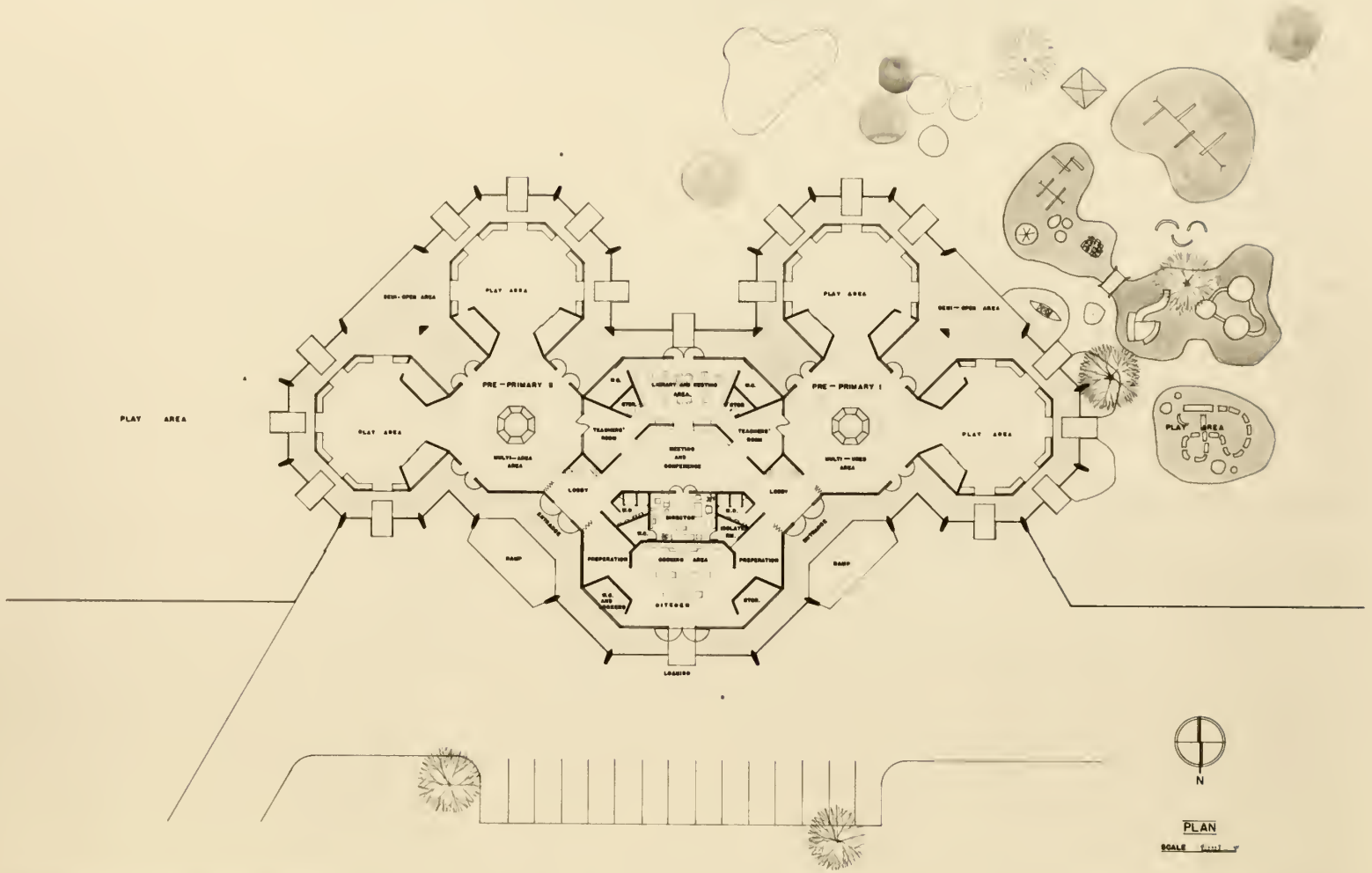
PRE-PRIMARY SCHOOL

KANSAS STATE UNIVERSITY
COLLEGE OF ARCHITECTURE AND DESIGN
A MASTER'S THESIS
BY PROF. PROF THEODORE A. GRADDIS
ARCHITECT OKLAHOMA PORTRAITURE



SITE PLAN 1" = 80'

THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND I PRE PRIMARY SCHOOL II PRIMARY SCHOOL III SECONDARY SCHOOL	**PRIMARY SCHOOL**	KANSAS STATE UNIVERSITY COLLEGE OF ARCHITECTURE AND DESIGN A MASTER'S THESIS BY/ PROF PROF THEODORE A SHADWICK ARCHITECT SUMANA PUNYARATABANDHU



PLAN

SCALE

THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND

I. PRE-PRIMARY SCHOOL

II. ARCHERY SCHOOL

III. BOARDING SCHOOL

PRE-PRIMARY SCHOOL

OF

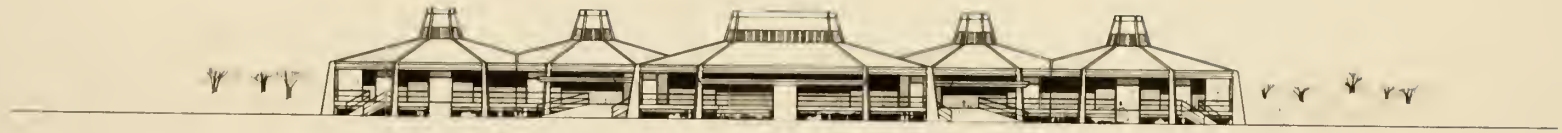
KANSAS STATE UNIVERSITY

COLLEGE OF ARCHITECTURE AND DESIGN

A MASTER'S THESIS

MAY 1959 PROF THEODORE A. OSBORNE

ARCHITECT SUKADHA SUNTARATARADHU



NORTH ELEVATION

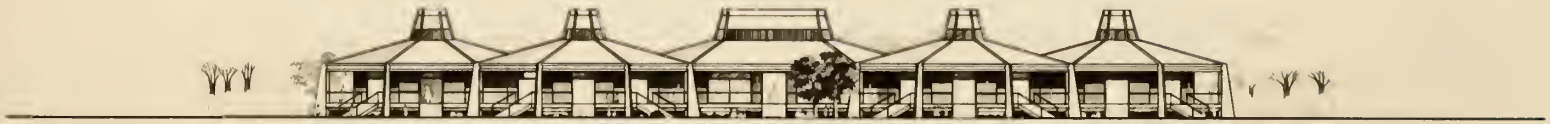
EAST ELEVATION

THE DESIGN OF CONTEMPORARY SCHOOLS
FOR THAILAND
I. PRE-PRIMARY SCHOOL
II. PRIMARY SCHOOL
III. SECONDARY SCHOOL

PRE-PRIMARY SCHOOL

KANSAS STATE UNIVERSITY
COLLEGE OF ARCHITECTURE AND DESIGN
A MASTER'S THESIS
MAJ PROF PROF THEODORE A SHAPMAN
ARCHITECT SMARSRA PUNYARATABANDHU

WEST ELEVATION



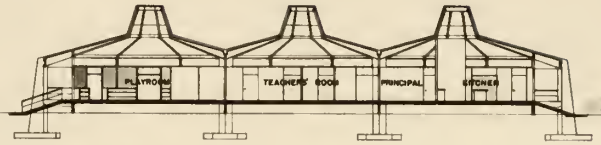
SOUTH ELEVATION

THE DESIGN OF CONTEMPORARY SCHOOLS
FOR THAILAND
a PRE-PRIMARY SCHOOL
b PRIMARY SCHOOL
c SECONDARY SCHOOL

PRE-PRIMARY SCHOOL

KANSAS STATE UNIVERSITY
COLLEGE OF ARCHITECTURE AND DESIGN
A MASTER'S THESIS

SECTION A - A



SECTION B - B

THE DESIGN OF CONTEMPORARY SCHOOLS
FOR THAILAND
I. PRE-PRIMARY SCHOOL
II. PRIMARY SCHOOL
III. SECONDARY SCHOOL

PRE-PRIMARY SCHOOL

of

KANSAS STATE UNIVERSITY
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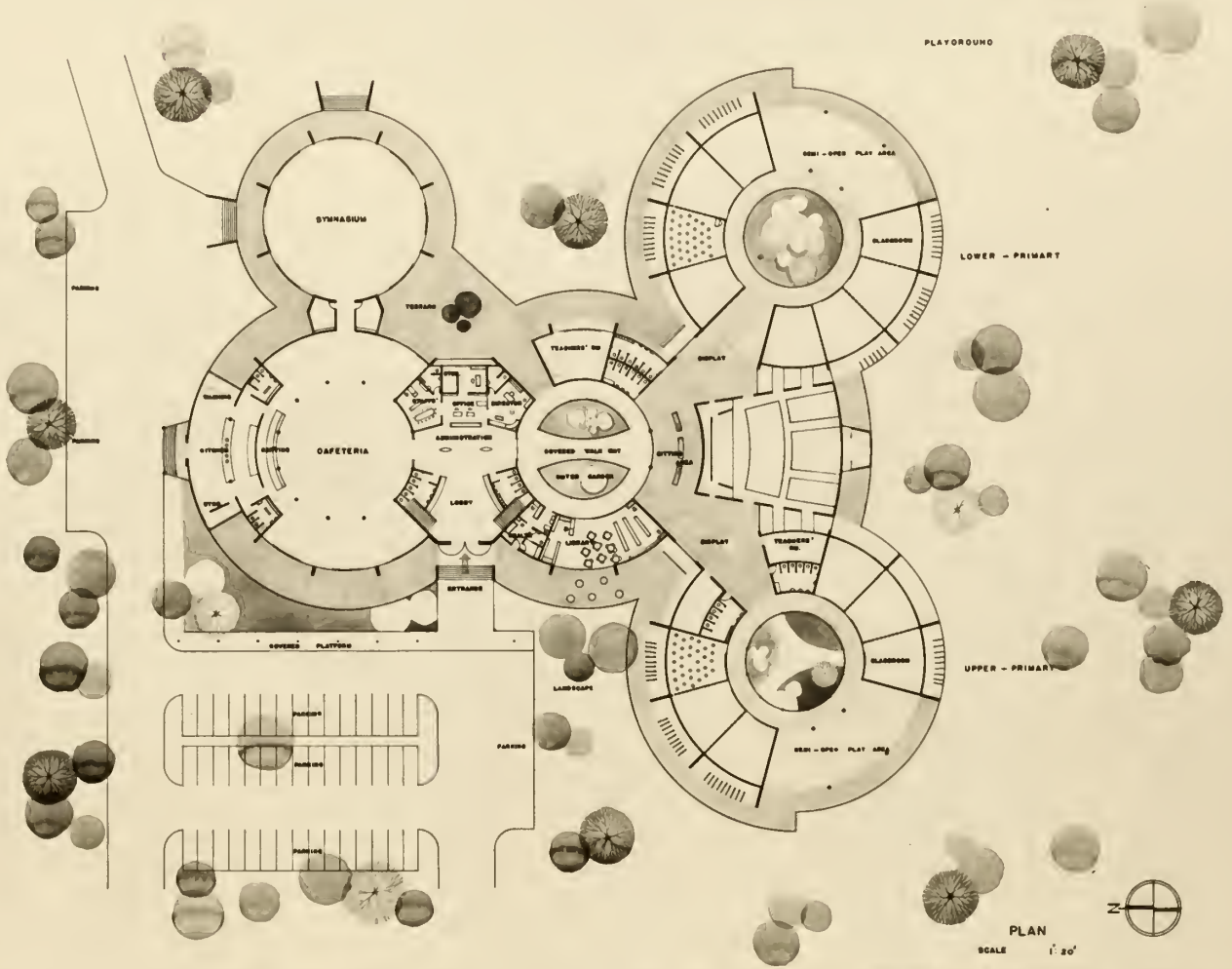
ARCHITECT SHARONS PHOTOGRAPHY



THE DESIGN OF CONTEMPORARY SCHOOLS
FOR THAILAND

PRIMARY SCHOOL

KANSAS STATE UNIVERSITY
A MASTER'S THESIS

WEST ELEVATION

NORTH ELEVATION

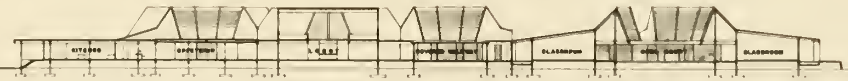
EAST ELEVATION

SOUTH ELEVATION

THE DESIGN OF CONTEMPORARY SCHOOLS
FOR THAILAND
I PRE PRIMARY SCHOOL
II PRIMARY SCHOOL
III SECONDARY SCHOOL

PRIMARY SCHOOL

KANSAS STATE UNIVERSITY
COLLEGE OF ARCHITECTURE AND DESIGN
A MASTER'S THESIS
RAJ POOT PROF THEODORE A. OSBORNE
ARCHITECT CHAROEN PUNYARATABANDHU



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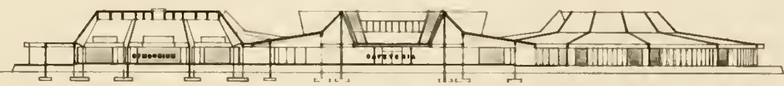

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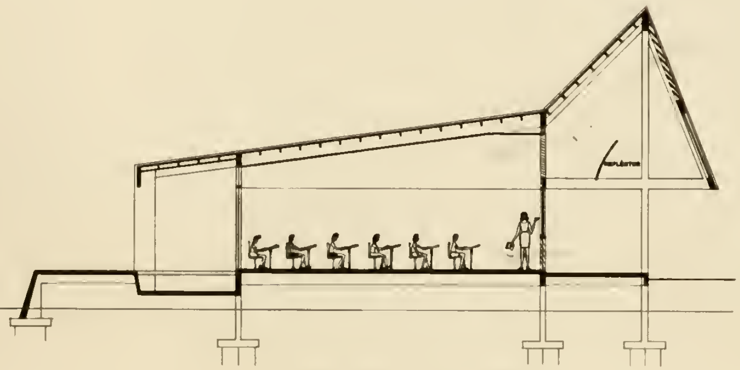
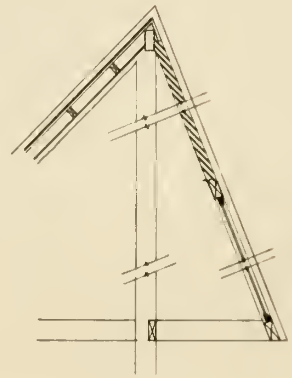


TYPICAL SECTION OF A CLASSROOM



DETAIL OF VENTILATION & LIGHTING

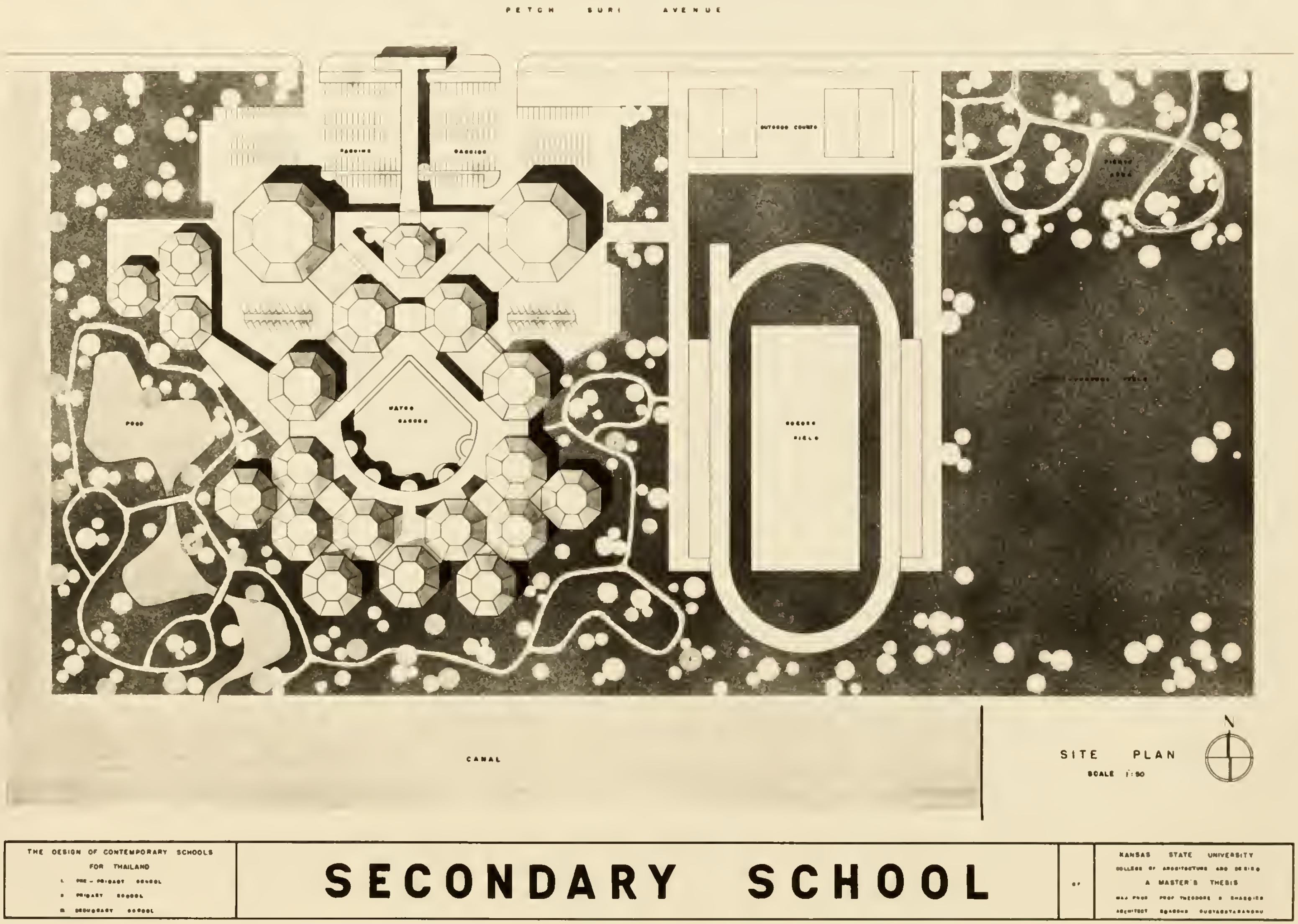
THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND	PRIMARY SCHOOL		KANSAS STATE UNIVERSITY A MASTER'S THESIS

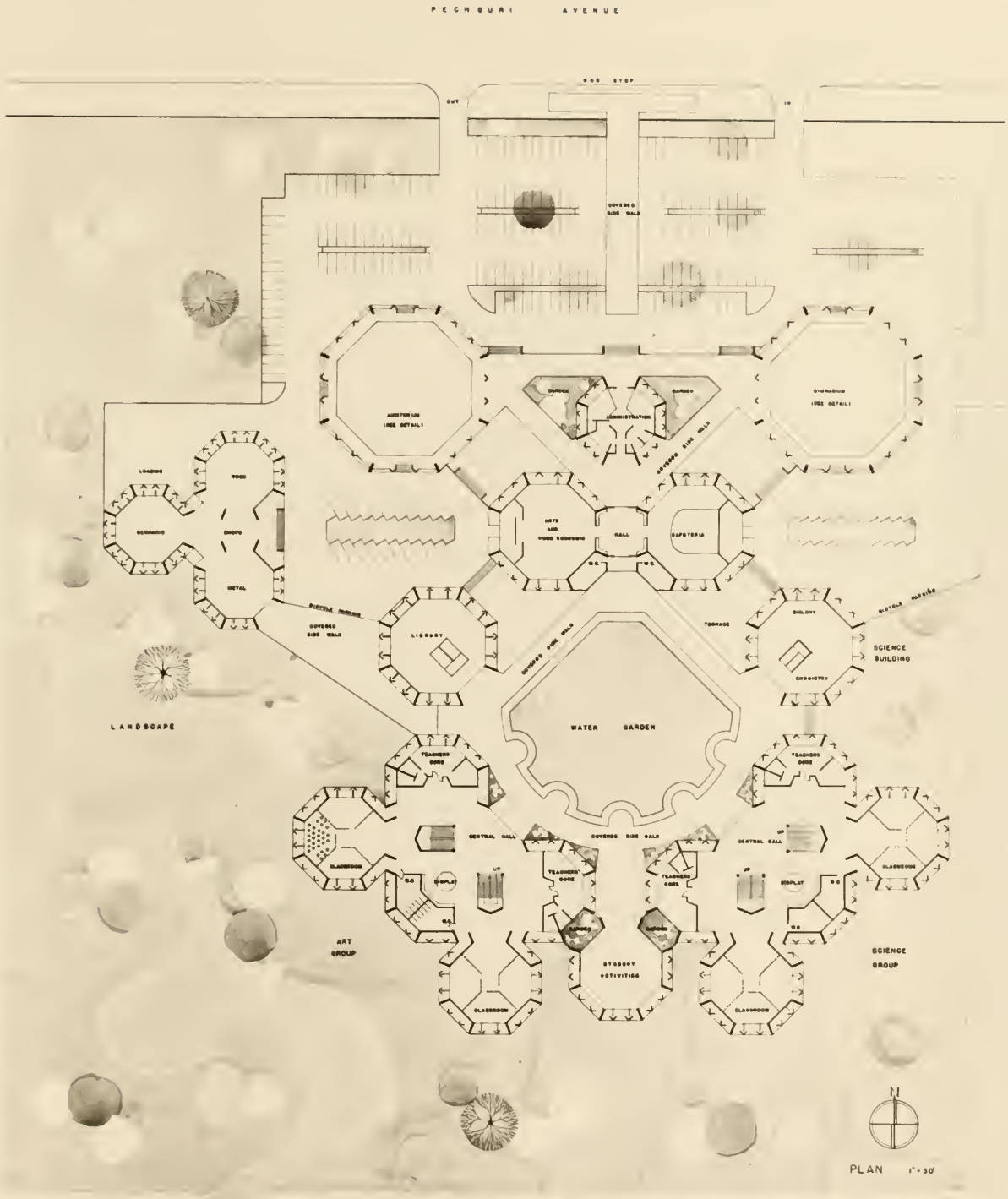
SECONDARY SCHOOL

PERSPECTIVE

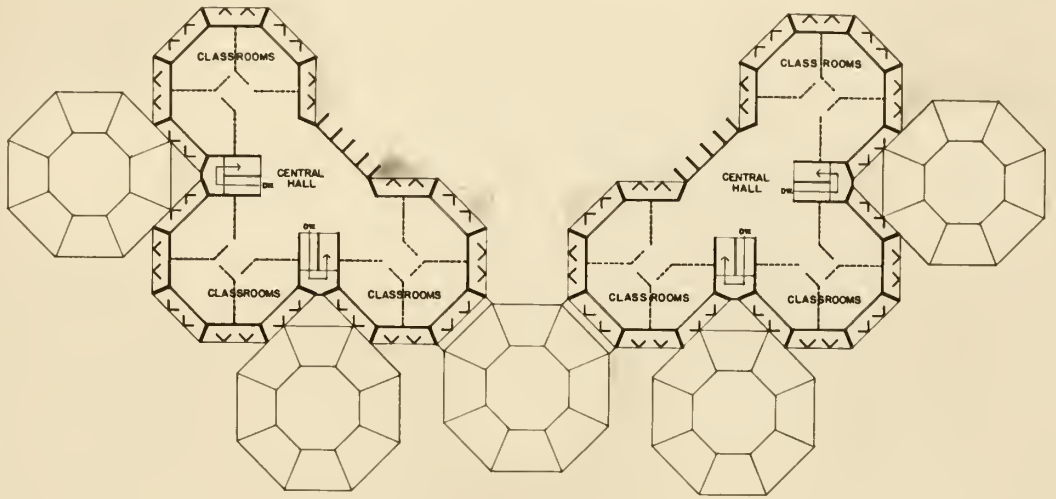
LOOKING THROUGH THE WALKWAY

LIBRARY


PETCH SURI AVENUE
CANAL
SITE PLAN
SCALE 1:50
THE DESIGN OF CONTEMPORARY SCHOOLS
FOR THAILAND
SECONDARY SCHOOL
KANSAS STATE UNIVERSITY
A MASTER'S THESIS



SECONDARY SCHOOL



UPPER FLOOR PLAN 1:30

SECONDARY SCHOOL

NORTH ELEVATION

WEST ELEVATION

THE DESIGN OF CONTEMPORARY SCHOOLS
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I. PRE - PRIMARY SCHOOL
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III. SECONDARY SCHOOL

SECONDARY SCHOOL

KANSAS STATE UNIVERSITY
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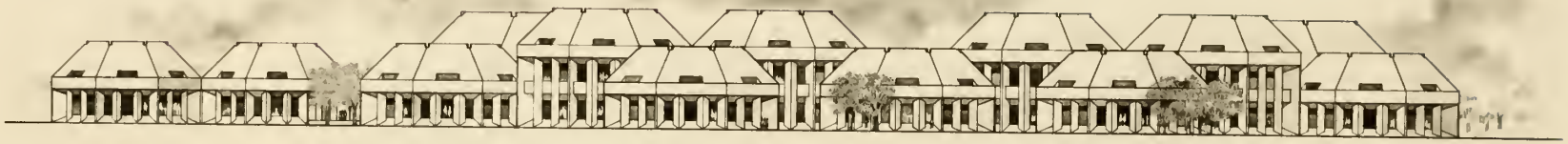
A MASTER'S THESIS

EAST ELEVATION



SOUTH ELEVATION

THE DESIGN OF CONTEMPORARY SCHOOLS
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I. PRE-PRIMARY SCHOOL
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SECONDARY SCHOOL

OF

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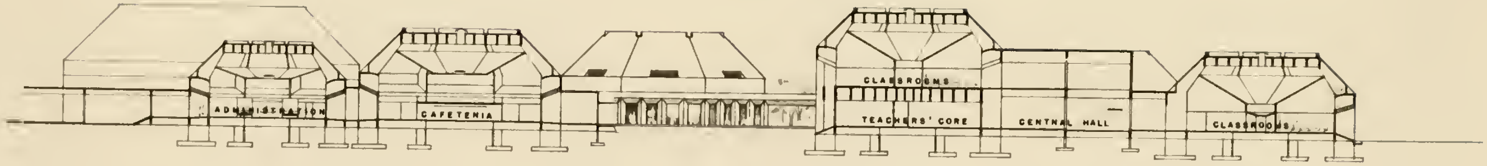
A MASTER'S THESIS
MAJ PROF PROF THEODORE A OSBORNE
ARCHITECT SHADDOCK GUSTAFSON & SHADDOCK



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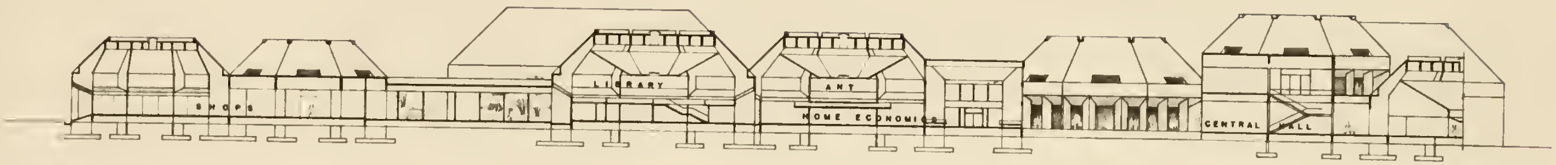
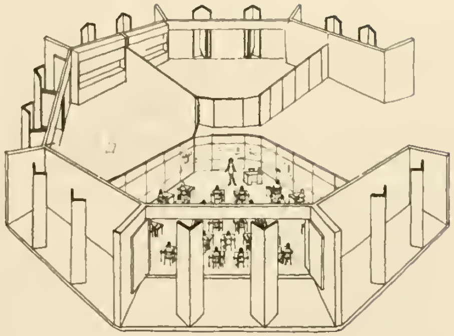


SECTION B - B

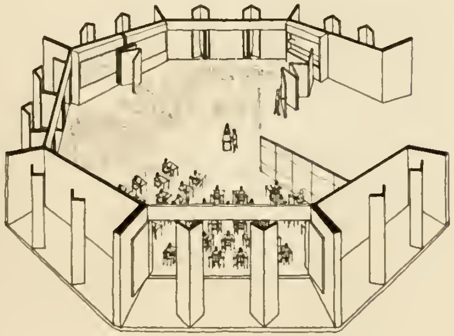
THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND
1. PRE - PRIMARY SCHOOL
2. PRIMARY SCHOOL
3. SECONDARY SCHOOL

SECONDARY SCHOOL

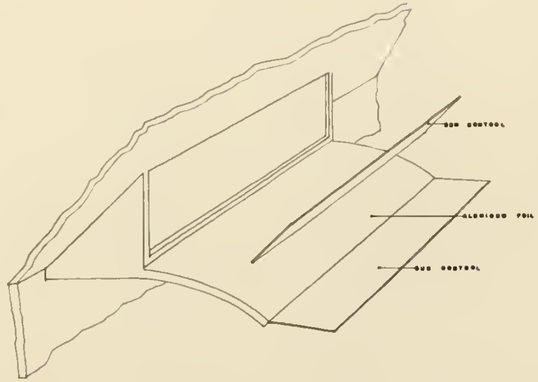
KANSAS STATE UNIVERSITY
COLLEGE OF ARCHITECTURE AND DESIGN
A MASTER'S THESIS



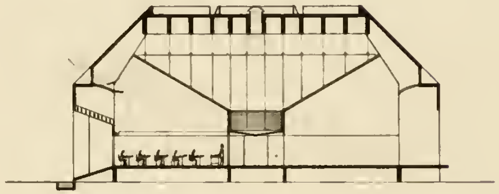
SECTION CLASSROOMS



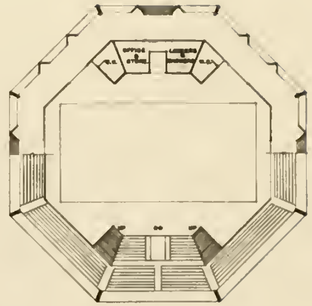
LARGE GROUP CLASSROOM



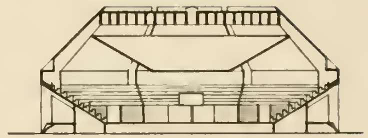
DETAIL OF CLEARSTORY



TYPICAL SECTION OF A CLASSROOM



PLAN



SECTION

GYMNASIUM
SCALE 1:20

THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND
I. PRE-PRIMARY SCHOOL
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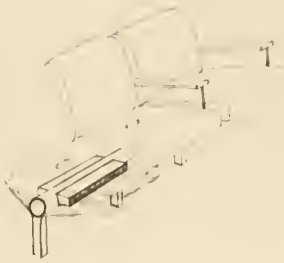
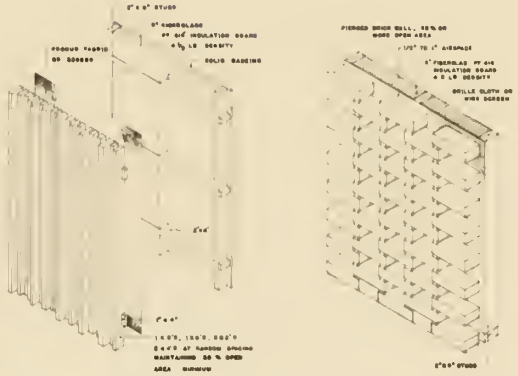
SECONDARY SCHOOL

KANSAS STATE UNIVERSITY
COLLEGE OF ARCHITECTURE AND DESIGN
A MASTER'S THESIS

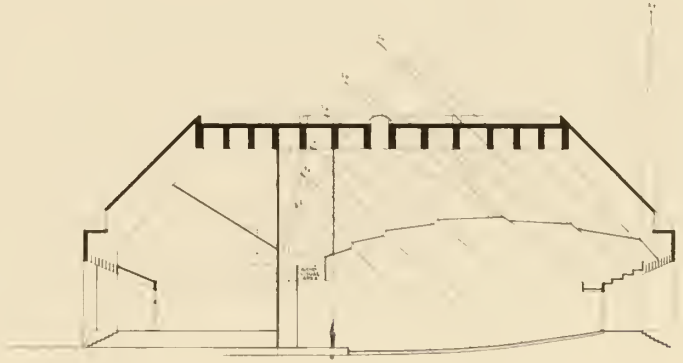
PLAN 1" = 16'



DETAIL OF AIR CIRCULATION BLOWER



ACOUSTICAL ABSORBERS



SECTION 1" = 10'

AUDITORIUM

THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND	SECONDARY SCHOOL	OF	KANSAS STATE UNIVERSITY COLLEGE OF ARCHITECTURE AND DESIGN A MASTER'S THESIS

THE DESIGN OF CONTEMPORARY SCHOOLS FOR THAILAND

by

SMARDHA PUNYARATABANDHU

B. Arch., Chulalongkorn University
Bangkok, Thailand, 1965

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

College of Architecture and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1968

The educational system of Thailand is in a process of development. More and higher quality schools are needed to meet school standards and the demand of a rapidly growing population and economy.

This project is the design of contemporary schools for Thailand. The introduction contains background material about the land and people of Thailand. The educational system, its history and organization are also reviewed.

The design consists of three different schools:

Pre-primary school

Primary school

Secondary school

The pre-primary school is designed for children aged three to six. The age group is divided into two class levels: Kindergarten I and II. The primary school consists of seven grades which are divided into lower primary grades 1 to 4, and upper primary grades 5 to 7. Secondary school, comprising 5 grades (3+2) is also divided into two levels, upper and lower.

The design is based principally on an understanding of the natural and social environments, as well as the school system. The architect has attempted to harmonize these factors in this design.